PSYTECH INTERNATIONAL

15FQ+

FIFTEEN FACTOR QUESTIONNAIRE Technical Manual

2026 REVISION

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INTRODUCTION

The Fifteen Factor Questionnaire Plus (15FQ+) is a self-report measure of normal personality designed for use with adults in non-clinical populations. It provides a comprehensive and theoretically grounded assessment of personality traits relevant to behaviour, interpersonal functioning, and performance across occupational, counselling, and personal development contexts.

This manual provides a detailed account of the theoretical foundations, scale development, psychometric properties, and applications of the instrument.

Appropriate Use

The interpretation and feedback of 15FQ+ results should always be guided by the specific purpose of the assessment. Profiles generated for selection contexts should be interpreted with particular attention to job-relevant competencies and behavioural fit, while profiles used in counselling or development contexts may place greater emphasis on self-insight, strengths, potential growth areas, and behavioural flexibility.

The 15FQ+ was developed primarily for use in occupational and applied assessment settings. Typical applications include, but are not limited to, the following:

- **Selection**: To support decision making by identifying the degree of alignment between an individual's personality profile and the behavioural requirements of specific roles or work environments.
- **Counselling**: Including personal development, educational and career guidance, career transition counselling, and counselling aimed at improving interpersonal effectiveness and work-related functioning.
- **Development**: For individual and team development purposes, including enhancing self-awareness, supporting self-management, informing leadership and competency development initiatives, and facilitating team building and coaching interventions.

The 15FQ+ is not a clinical or diagnostic instrument. It must not be used to identify, diagnose, or evaluate medical conditions, mental illness, psychiatric disorders, cognitive impairments, or physical disabilities. Accordingly, it is inappropriate for applications such as the diagnosis of neuropsychological or psychiatric conditions, the assessment of suicidal ideation or risk, the prediction of criminal behaviour, the evaluation of academic attainment, or the measurement of cognitive ability, learning difficulties, or sensory–motor functioning.

To ensure meaningful responding and valid interpretation, the 15FQ+ should be administered to adults with a minimum educational level equivalent to GCSE standard or sufficient English literacy to engage with item content accurately and consistently.

The 15FQ+ should not be used as the sole basis for decision making in high-stakes contexts such as personnel selection, promotion, or development planning. Best practice requires that results be integrated with other relevant sources of information, such as structured interviews, reference checks, performance records, work samples, and complementary psychometric measures.

User Qualifications

The 15FQ+ is a Level 2 personality assessment and should be administered, scored, and interpreted by practitioners who hold, or are working towards, the EFPA Certificate at Level 2: Test User Occupational Personality (TUP), formerly the BPS Level B (Intermediate) Certificate of Competence in Occupational Testing, or an equivalent, similar certification. Such qualification ensures that practitioners possess the knowledge and practical skills required to administer, score, interpret, and provide feedback on personality assessments in occupational settings.

For practitioners whose assessment needs are met primarily by the Psytech GeneSys range, the Psytech Testing Certificate (PTC) offers an alternative three-day pathway, conferring the EFPA Level 1 Assistant Test User (ATU) Certificate and covering independent interpretation and feedback of Psytech assessments.

Psytech offers in-house and block-booking training options for organisations requiring multiple practitioners to be trained. Practitioners are encouraged to consult the Psytech website (https://psytech.com) for current training schedules, course availability, and further details.

Qualified test users are eligible for inclusion on the BPS Register of Qualified Test Users (RQTU), and use of the 15FQ+ should be consistent with the ethical guidelines and professional standards of the relevant regulatory or professional body, including the British Psychological Society (BPS) and, where applicable, the Health and Care Professions Council (HCPC).

THEORETICAL BACKGROUND TO THE 15FQ+

Raymond B. Cattell's approach to the study and measurement of personality was systematic and grounded in empirical research. In 1946, he published *The Description and Measurement of Personality*, identifying three primary sources of data for constructing a comprehensive personality assessment:

- **T-data (tests):** Behaviour directly observed and measured under controlled conditions, such as such as reaction time, physiological responses, or performance on problem-solving tasks.
- **L-data (life):** Information derived from records of life outcomes or ratings by others about an individual's typical behaviour, such as employment history, academic achievements, or supervisor evaluations.
- **Q-data (questionnaire):** obtained via questionnaires where individuals describe their own typical behaviour, preferences, and feelings. The 15FQ+ is an example of a Q-data instrument.

By integrating multiple data sources and applying rigorous statistical analysis, Cattell established a framework that linked theory, empirical measurement, and practical assessment. Using these sources, Cattell applied factor analysis to identify 16 primary personality factors (originally including intelligence), which were later adapted and refined to result in the 15 core personality factors assessed by the 15FQ+ (with Intelligence re-conceptualised as Intellectance), distinguishing between surface traits (observable syndromes of behaviour) and source traits (underlying personality dimensions detectable via factor analysis).

Importantly, this process ensured that each factor captured broad, meaningful dimensions of personality rather than narrow behavioural patterns. Subsequent research further refined these factors. Cattell's 15 primary personality factors are now understood to map onto five broad second-order factors, which correspond to the Big Five model popularised by Tupes & Christal (1961), Costa & McCrae (1987), and Goldberg (1990). The 15FQ+ enables users to calculate both primary factor scores and second-order/global factor scores, with the latter automatically generated in the computer narrative report using norms selected by the test user.

Rationale for Personality-Based Measures in Occupational Contexts

Contemporary personnel selection research emphasises that effective selection systems should be designed at the system level, incorporating multiple predictors that assess different but complementary aspects of work behaviour. Recent theoretical and meta-analytic work highlights that predictors such as personality measures contribute meaningfully to selection decisions by capturing stable behavioural tendencies related to interpersonal functioning, self-regulation, and contextual performance, domains not fully assessed by cognitive or skills-based measures alone. Within such multi-method assessment systems, personality instruments serve an important role by informing decisions about behavioural fit, developmental needs, and likely patterns of work behaviour across roles and contexts (Sackett et al., 2022).

From a validity theory perspective, personality measures demonstrate substantially stronger relationships with job performance than are typically observed in single primary studies. This body of work supports the use of well-constructed personality questionnaires as legitimate predictors of work-related behaviour when they are used appropriately and interpreted within a broader assessment framework. More recent models of job performance further clarify how personality contributes to occupational effectiveness, and distinguish between multiple criterion domains, including task performance, contextual performance, adaptive performance, and counterproductive work behaviour (Rotundo & Sackett, 2002; Sackett, 2022, van Lill & Taylor, 2022). Personality traits are particularly relevant to contextual and adaptive performance domains, which include behaviours such as cooperation, dependability, emotional regulation, openness to change, and stress tolerance. These behaviours are not always captured effectively through traditional assessment methods such as interviews, curriculum vitae reviews, or work-sample tests, yet they play a critical role in long-term effectiveness and organisational functioning.

The 15FQ+ was designed as a personality-based measure of typical work behaviour, rather than as a measure of cognitive ability or maximum performance. In line with contemporary personality theory and applied assessment practice, the instrument focuses on self-reported dispositional tendencies, including Intellectance, which reflects cognitive style and engagement with complex ideas, rather than intellectual ability or general mental capacity as assessed by cognitive tests. By measuring enduring dispositions related to interpersonal style, emotional adjustment, self-regulation, and work orientation, the instrument provides information that is directly relevant to understanding how individuals are likely to behave across a range of work situations, rather than how they may perform on a narrowly defined task at a single point in time.

In this way, the 15FQ+ is particularly well suited to applications in personnel selection, career development, leadership development, and counselling contexts. Consistent with best practice in psychological assessment, the value of the 15FQ+ lies in its contribution to a multi-method assessment strategy, where personality data are integrated with information from interviews, performance history, work-sample measures, and other relevant sources to form a balanced and defensible assessment judgement.

Development of the 15FQ+

The 15FQ+ represents a revision and update of the Fifteen Factor Questionnaire (15FQ), which was first published by Psytech in 1992. The 15FQ+ remains true to the original version of this test, which measured 15 of the core personality factors first identified by Cattell in 1946, while being a shorter, yet more robust measure of these primary personality factors. Consistent with Cattell's distinction between different sources of personality data, the 15FQ+ is a Q-data instrument, relying on structured self-report items to assess typical patterns of behaviour, preferences, and dispositions. As such, its development placed particular emphasis on content validity, construct representation, and the behavioural breadth of item content, rather than narrowly defined surface traits.

Most significantly, the 15FQ+ incorporates a number of innovations, such as the addition of a measure of Intellectance (Scale ß), to replace the Intelligence scale (Factor B) of the 16PF, which was excluded from the 15FQ for theoretical and practical reasons. Intellectance (ß) replaces the traditional intelligence factor (Factor B) found in earlier Cattell-based measures, reflecting contemporary psychometric consensus that cognitive ability is more appropriately assessed using timed ability tests, while intellectual engagement and curiosity can be meaningfully captured as personality characteristics within an untimed assessment framework.

The development processes outlined below form the foundational basis for the revised 15FQ+ currently available and illustrate the procedures through which content validity was established.

1. **Construct definition and item generation**: A comprehensive literature review defined each of the 15 core factors in line with Cattell's source trait conceptualisations. Items were generated by experienced psychologists to cover the full behavioural domain of each factor. Items were written in clear English suitable for adults with functional workplace-level proficiency, with careful attention to minimising culture- and gender-related bias.

2. **Trialling and construct alignment**: Trial items were administered alongside Form A of the 16PF (Fourth Edition) to a sample of 183 respondents. This cross-validation confirmed that 15FQ+ items aligned with the intended personality dimensions, supporting construct continuity with established Cattell-based measures.

Table 1. Exploratory Factor Analysis of the 15FQ+ and 16PF (Form A) scales

Scale Factors	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
15FQ+ A	.61	-	-	.31	-
15FQ+ ß	-	-	-	.48	-
15FQ+ C	-	.76	-	-	-
15FQ+ E	.40	-	-	.68	-
15FQ+ F	.82	-	-	-	-
15FQ+ G	-	-	-	-	.75
15FQ+ H	.63	-	-	.42	-
15FQ+ I	-	-	.63	-	-
15FQ+ L		-.38	-	-	-
15FQ+ M	-	-	.51	-	-.36
15FQ+ N	-	-	-	-.39	.50
15FQ+ O	-	-.61		-.40	-
15FQ+ Q1	-	-	.45	-	-
15FQ+ Q2	-.71	-	-	-	-
15FQ+ Q3	-	-	-	-	.65
15FQ+ Q4	-	.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 Q1	-	-	-	-	-
16PF Q2	-.56	-	-	-	-
16PF Q3	-	-	-	-	.69
16PF Q4	-	.85	-	-	-

Note. Only factor loadings above the 0.30 threshold are reported in Table 1

3. **Iterative refinement and content evaluation**: Items with poor psychometric properties, weak item–scale relationships, or inadequate construct coverage were removed or revised. This process was repeated until each scale balanced psychometric acceptability with broad construct representation.
4. **Scale-level factor analysis**: The 16 primary scales (including Intellectance) were factor-analysed using the full standardisation sample. Five higher-order (global) factors, broadly consistent with the Big Five, could also be extracted.
5. **Development of criterion-keyed and validity scales**: Additional scales, including Faking Good, Faking Bad, Work Attitude, and Emotional Intelligence, were developed using criterion-keying procedures. An Infrequency scale was constructed by identifying low base-rate response options endorsed by endorsed by very few respondents.

Overview of the 15FQ+ Scales

The 15FQ+ consists of 16 primary personality factors, that can be grouped into five second-order (global) factors, with additional validity and criterion-keyed scales. Each scale contains 12 items (8 for Social Desirability), using a normative response format.

Table 2. 15FQ+ primary scales

Scale	Low scorers	High scorers
Factor A (ƒA)	Distant Aloof	Empathic
Intellectance (ß)	Low Intellectance	High Intellectance
Factor C (ƒC)	Affected by Feelings	Emotionally Stable
Factor E (ƒE)	Accommodating	Dominant
Factor F (ƒF)	Sober Serious	Enthusiastic
Factor G (ƒG)	Expedient	Conscientious
Factor H (ƒH)	Retiring	Socially-bold
Factor I (ƒI)	Hard-headed	Tender-minded
Factor L (ƒL)	Trusting	Suspicious
Factor M (ƒM)	Concrete	Abstract
Factor N (ƒN)	Direct	Restrained
Factor O (ƒO)	Confident	Self-doubting
Factor Q1 (ƒQ1)	Conventional	Radical
Factor Q2 (ƒQ2)	Group-orientated	Self-sufficient
Factor Q3 (ƒQ3)	Informal	Self-disciplined
Factor Q4 (ƒQ4)	Composed	Tense-driven

Table 3. 15FQ+ global factors

Global Factor	Contributing Primary Scales
Extraversion–Introversion	ƒA, ƒF, ƒH, ƒQ2
Low aNxiety–High aNxiety	ƒC, ƒL, ƒO, ƒQ4
Pragmatism–Openness (to Experience)	ƒA, ƒI, ƒM, ƒQ1
Independence–Agreeableness	ß, ƒE, ƒL, ƒQ1
Low self-Control–High self-Control	ƒG, ƒN, ƒQ3

Table 4. 15FQ+ Impression Management Indicators

Scale	Function
Social Desirability (SD)	Presenting unrealistic positive self-image
Central Tendency (CT)	Indecisive or midpoint responding
Infrequency	Inattentive or random responding
Faking Good	Positive response distortion
Faking Bad	Negative response distortion

Table 5. 15FQ+ Criterion-derived Scales

Scale	Function
Emotional Intelligence (eIQ)	Reflects ability to understand and regulate one's own emotions and respond appropriately to others.
Work Attitude (WA)	Reflects orientation toward rules and diligence in work settings, including reliability in task completion.

STRUCTURAL COMPOSITION AND SCORING FRAMEWORK OF THE 15FQ+

The 15FQ+ assesses personality through a hierarchical framework of 16 primary personality scales, which capture specific trait domains, and five second-order or global factors, reflecting broader personality dimensions often aligned with the Big Five model. In addition to these core scales, the assessment includes impression management (validity-related) indices that provide information about response style and profile interpretability.

Together, these scales allow for both detailed and broad assessments of personality, enabling the test user to consider the nuances of individual traits as well as overarching patterns of behaviour, preferences, and interpersonal tendencies. The hierarchical structure ensures that primary scales contribute to the global factors while preserving their unique interpretive value.

While this chapter focuses on conceptual definitions and behavioural themes, psychometric properties, normative data, and scoring details are addressed in later sections.

Impression Management Scales

The 15FQ+ includes a number of impression management or validity indices designed to assist the test user in evaluating the validity and interpretability of the assessment profile. These indicators serve as a critical preliminary check, as elevated scores may signal that aspects of the personality profile should be interpreted with caution or, in some cases, may not be interpretable.

These indicators include:

- *Infrequency: indicating inattentive, inconsistent, or random responding, with higher scores (scores of 8-10) suggesting that the respondent may not have engaged adequately with the questionnaire items.
- *Central Tendency (CT): reflects the degree to which respondents avoid decisive responses by selecting mid-range options, with higher scores (scores of 8-10) suggesting indecisiveness, a poorly defined self-concept, or a genuinely moderate personality profile.

* The only scales in the 15FQ+ electronic reports that are not reported using sten scores. This is due to these scales not being normally distributed but scaled according to the risk (probability) that a given score indicates that the profile is not valid.

- Social Desirability (SD): a dedicated scale consisting of eight (8) items, independent of the primary personality factors, with higher scores (sten 8-10) suggesting an attempt to present an unrealistically positive image of themselves to others or highly over-idealised self-image . Calculated in both hand-scored and electronic reports.
- Faking Good and Faking Bad: criterion-keyed scales derived from combinations of primary factors associated with positive or negative impression management.

These indicators do not measure substantive personality traits, but rather an indication of the individuals' conscious or unconscious impression management profile. The inclusion of these indicators reflects the 15FQ+'s design for use in occupational and applied assessment contexts, where understanding response validity is essential for responsible interpretation. Where these indicators suggest compromised validity, interpretation of primary and global scale scores should be undertaken with caution.

Criterion-derived Scales

The 15FQ+ also includes criterion-derived scales, which are composite indices developed to support applied interpretation by summarising meaningful patterns across multiple primary traits. These scales do not represent independent source traits but provide additional, practice-oriented perspectives on behavioural functioning.

eIQ – Emotional Intelligence

- Low scores (Lacking empathy): May struggle to understand others' thoughts and feelings, appear insensitive or moody, and experience difficulty regulating emotions.
- High scores (Empathic): Insightful and perceptive, showing understanding for others, social awareness, emotional maturity, and constructive self-regulation.

Work Attitude

- Low scores: Unconventional, question rules and authority, may be disorganised, and focus on innovation or big-picture thinking over structured task completion.
- High scores: Dutiful, methodical, and reliable, respecting rules and authority, attentive to detail, and focused on completing tasks to standard.

Global Personality Factors

The 15FQ+ primary personality scales align into five second-order global personality factors, which reflect broader patterns of personality functioning. These global dimensions emerge from the empirical intercorrelations among the primary scales and are conceptually aligned with the widely recognised Big Five model of personality (Costa & McCrae, 1987; Goldberg, 1990).

In practice, global factors assist the test user in identifying overarching tendencies (e.g., general emotional stability or interpersonal orientation), while the primary scales explain how those tendencies are expressed in more specific behaviours.

E – Extraversion vs Introversion

- Low scores (Extraversion): Seek interpersonal contact, social engagement, and activity, and are generally energised by interaction with others.
  Primary scales = ƒA+, ƒF+, ƒH+, ƒQ2-
- High scores (Introversion): Prefer solitary environments, require less social contact, are more inwardly focused, drawing energy from reflection and internal experience.
  Primary scales = ƒA-, ƒF-, ƒH-, ƒQ2+

N – Low aNxiety vs High aNxiety

- Low scores (Low Anxiety): Generally calm, well-adjusted, and emotionally stable orientation, ability to cope effectively with pressure
  Primary scales = ƒC+, ƒL-, ƒO-, ƒQ4-
- High scores (High Anxiety): Increased emotional sensitivity and vulnerability, greater worry, tension, mood fluctuation, and reactivity to stressors.
  Primary scales = ƒC-, ƒL+, ƒO+, ƒQ4+

O – Pragmatism vs Openness to Experience

- Low scores (Pragmatism): Tend to favour realism, practicality, and established methods, and may be less inclined toward novelty or abstract possibilities.
  Primary scales = ƒA-, ƒI-, ƒM-, ƒQ1-
- High scores (Openness): More receptive to new ideas, imaginative possibilities, and engage with conceptual or unconventional perspectives.
  Primary scales = ƒA+, ƒI+, ƒM+, ƒQ1+

A – Independence vs Agreeableness

- Low scores (Independence): Tend to be strong-willed, self-determining, and prepared to challenge others when necessary
  Primary scales = ß+, ƒE+, ƒL+, ƒQ1+
- High scores (Agreeableness): Typically tolerant, obliging, and willing to compromise, placing value on cooperation and maintaining positive interpersonal relationships.
  Primary scales = ß-, ƒE-, ƒL-, ƒQ1-

C – Low self-Control vs High self-Control

- Low scores (Low self-Control): Generally spontaneous, flexible, or impulsive orientation, with less emphasis on restraint and conformity to external expectations.
  Primary scales = ƒG-, ƒN-, ƒQ3-
- High scores (High self-Control): Greater self-discipline, impulse control, and adherence to social rules and internalised standards, with behaviour tending to be more structured, regulated, and norm-guided.
  Primary scales = ƒG+, ƒN+, ƒQ3+

Global factor scores provide a broad-brush overview of an individual's general personality orientation, summarising consistent patterns across multiple primary traits. While they offer a useful integrative perspective, global factors are not intended to replace interpretation at the primary scale level. Rather, they serve as an organising framework within which primary traits can be meaningfully interpreted and integrated.

Primary Personality Scales

At the core of the 15FQ+ are 16 primary personality scales, each representing a distinct source trait derived from Cattell's factor-analytic model of normal personality. Each scale provides specific insights into the respondent's behavioural tendencies, decision-making style, interpersonal approach, emotional responsiveness, and problem-solving orientation.

Each primary scale is conceptualised as a bipolar dimension, with meaningful behavioural tendencies associated with both low and high scores. Importantly, these dimensions do not reflect desirable versus undesirable traits, but rather contrasting styles of thinking, feeling, and behaving that may be more or less adaptive depending on occupational role, context, and situational demands. These primary scales form the foundational building blocks of the 15FQ+ and are the level at which the greatest specificity of personality description is obtained.

Factor A – Distant Aloof vs Empathic

- Low scores (Distant Aloof): Private, impersonal, and emotionally reserved. May appear distant, slow to offer support or form emotional attachments.
- High scores (Empathic): Warm, friendly, and interested in others around them. Attentive to needs of others, often seen as caring, encouraging, and genuine in work settings.

Factor β – Low Intellectance vs High Intellectance

- Low scores (Low Intellectance): Likely lacks confidence in one's own intellectual abilities, uncomfortable with complexity.
- High scores (High Intellectance): Confident working on intellectually challenging tasks, enjoys acquiring new information and skills.

Factor C – Affected by Feelings vs Emotionally Stable

- Low scores (Affected by Feelings): Prone to worry, anxiety, and mood fluctuations, may react emotionally under pressure.
- High scores (Emotionally Stable): Calm, dependable, and resilient, able to manage stress and maintain perspective in challenging situations.

Factor E – Accommodating vs Dominant

- Low scores (Accommodating): Prefer following others' lead, avoid confrontation, and may hesitate to assert opinions.
- High scores (Dominant): Assertive, competitive, and willing to take charge, comfortable influencing and directing others.

Factor F – Sober Serious vs Enthusiastic

- Low scores (Sober Serious): Restrained and cautious, less playful in social interactions.
- High scores (Enthusiastic): Carefree, lively, and cheerful, enjoy excitement and socially stimulating environments.

Factor G – Expedient vs Conscientious

- Low scores (Expedient): Spontaneous and flexible, willing to bend rules, less focused on procedure or protocol.
- High scores (Conscientious): Dutiful, responsible, and organised, value rules and standards at work.

Factor H – Retiring vs Socially-bold

- Low scores (Retiring): Reserved, shy, and hesitant in social situations, may be self-conscious in group events.
- High scores (Socially-bold): Confident, talkative, and willing to initiate social contact.

Factor I – Hard-headed vs Tender-minded

- Low scores (Hard-headed): Unsentimental, matter-of-fact, and practical, focus on facts over feelings.
- High scores (Tender-minded): Sentimental, creative and sensitive, respond to situations and events emotionally.

Factor L – Trusting vs Suspicious

- Low scores (Trusting): Accept information at face value, willing to believe and depend on others.
- High scores (Suspicious): Doubt and question others' motives, cynical, and reluctant to place their faith in others.

Factor M – Concrete vs Abstract

- Low scores (Concrete): Practical, realistic, and focused on immediate facts. Less drawn to theory or conceptual thinking.
- High scores (Abstract): Imaginative, creative, and idea-oriented. Enjoy conceptual exploration and innovative problem-solving.

Factor N – Direct vs Restrained

- Low scores (Direct): Genuine, straightforward, and forthright in their social interactions.
- High scores (Restrained): Diplomatic, socially aware, and conscious of the impact of their behaviours on others.

Factor O – Confident vs Self-doubting

- Low scores (Confident): Self-assured and unworried of their ability to successfully deal with life's challenges.
- High scores (Self-doubting): Tend to worry, doubt themselves, and be sensitive to threats and challenges.

Factor Q1 – Conventional vs Radical

- Low scores (Conventional): Traditional, prefer tried and tested methods, and conventional approaches.
- High scores (Radical): Open to change, innovative, and enjoys experimentation and novel, unconventional approaches.

Factor Q2 – Group-orientated vs Self-sufficient

- Low scores (Group-orientated): Seek input from others, prefer teamwork over solitary work environments.
- High scores (Self-sufficient): Self-reliant, autonomous, and likely reluctant to ask others for advice.

Factor Q3 – Informal vs Self-disciplined

- Low scores (Informal): Little concern for social standing, tends to question authority and not conform to traditions.
- High scores (Self-disciplined): Values self-control, tends to repress impulses and are respectful of authority and procedures.

Factor Q4 – Composed vs Tense-driven

- Low scores (Composed): Relaxed, able to maintain composure under stress, patient and tolerant of interruptions.
- High scores (Tense-driven): Restless, driven, may experience higher impatience with interruptions.

Integrative Structure of the 15FQ+

Taken together, the structure of the 15FQ+ supports a layered approach to personality assessment and profile interpretation:

- Response-style and validity indicators inform the confidence with which the profile may be interpreted.
- Global factors provide higher-order integration;
- Primary scales offer detailed trait-level insight;

This hierarchical organisation ensures that personality assessment using the 15FQ+ is both theoretically grounded and practically informative, allowing test users to move from broad personality orientations to nuanced behavioural hypotheses while remaining attentive to issues of response validity.

ADMINISTRATION, FEEDBACK, AND REPORTING

The 15FQ+ can be administered individually or in a group context. Practitioners can choose to administer the 15FQ+ using paper-and-pencil format, or in an online format using the GeneSys Online platform. Scoring is done automatically on the GeneSys Online platform, or can be hand-scored by the practitioner for paper-and-pencil administrations. The reports are available almost immediately after the online assessment has been completed. The 15FQ+ is untimed and takes approximately 30 minutes to complete the 200 items.

Respondent Suitability and Demands on the Test-Taker

The 15FQ+ is a self-report measure of normal-range personality characteristics intended for use with adult respondents. It is designed for application in a range of occupational, developmental, counselling, and research contexts, including but not limited to selection, development, career guidance, and team-based interventions. The instrument is not intended for clinical diagnosis, nor does it assess cognitive ability or psychopathology.

While the 15FQ+ is available in over 30 languages, including Arabic, Chinese, Portuguese and Spanish amongst others, the information in this manual refers specifically to the UK English version of the 15FQ+. For more information about the other language versions, please contact info@psytech.com.

Appropriate use requires that respondents can understand the item content and 3-point Likert-type response format. Readability analysis conducted using the Flesch–Kincaid index, referenced due to its widespread use, suggests that the item content of the 15FQ+ is relatively accessible, yielding an estimated reading level of approximately age 12-13 reading level (Flesch Reading Ease score = 70.52). Furthermore, given the 15FQ+ is meant to support occupational decisions, it is recommended that respondents demonstrate a minimum English language proficiency or cognitive-verbal ability reflected by General Reasoning Test (GRT) scores above the 4th stanine. This recommendation is intended to reduce the risk of misinterpretation of item nuances, which may compromise response validity and the interpretability of results. As with all psychometric assessments, local legislation requires that testing be conducted within a clearly defined professional context and overseen by a suitably registered professional. Where language proficiency is uncertain, practitioners are advised to consider alternative assessment strategies, additional preparatory explanation, or the use of supplementary measures.

As a 200-item assessment, the 15FQ+ places moderate demands on sustained attention, reading comprehension, and self-reflection. It does not impose time pressure and does not

require specialised motor skills or particular handedness. The assessment is therefore suitable for respondents with typical visual and motor functioning. Where respondents experience visual impairment, reasonable accommodation may be provided, such as the use of larger screens or assisted reading of items by a registered psychology professional. Assistance should be limited to reading items verbatim, without interpretation or explanation, to preserve the standardisation of administration.

Modes of Administration

The 15FQ+ may be administered in paper-and-pencil or internet-based format via the Psytech GeneSys Online assessment platform.

For online administration, the following minimum technical requirements apply:

- A fast, stable internet connection;
- A supported web browser (e.g., Chrome, Safari, or Edge);
- An appropriate device (desktop, laptop, tablet, or smartphone) with adequate screen size for comfortable reading.

Unsupervised administration is appropriate where identity verification, testing conditions, and respondent motivation are deemed adequate for the intended purpose of assessment. Unsupervised administration is typically conducted online, using a secure assessment link generated through the GeneSys Online platform. While the system provides standardised instructions automatically, it is recommended that the test administrator remains available to address technical difficulties or procedural queries should they arise.

Supervised administration is recommended in high-stakes contexts or where closer monitoring of testing conditions is required, or if the candidate is not comfortable with online, technology-based administrations. Supervised administration may take several forms, including

- Paper-and-pencil administration, with responses later captured on the GeneSys Online platform,
- On-site computer-based administration using the GeneSys Online platform, or
- Managed group administration, which allows real-time monitoring of respondents' progress and may be used in conjunction with video conferencing software.

Scoring and Reporting Procedures

Scoring of the 15FQ+ involves converting raw scores for each scale into standardised scores expressed as stens. Sten scores range from 1 to 10, with a mean of 5.5 and a standard deviation of 2. Scores of 5 or 6 are considered average, with progressively higher or lower scores indicating increasing deviation from the norm.

When the 15FQ+ is administered via the GeneSys Online platform, scoring is completed automatically once a report set is requested. When the paper-and-pencil version of the assessment is completed, the responses are captured on-platform for scoring and report generation. Raw-to-sten conversion is performed using the norm group selected by the test user. A range of reports is available for the 15FQ+, with the choice of report type and norm group requiring professional judgement. The norm groups available can be found on the GeneSys platform, and are summarised in the Norm chapter of this manual. Reports are available primarily in English, with additional languages dependent on availability through Psytech International. The 15FQ+ has four report sets, listed as follows:

<u>15FQ+ Complete Report Set</u>

- 15FQ+ Standard Report
- 15FQ+ Profiles Report
- 15FQ+ Ideal Profiles Report
- 15FQ+ Ideal Profiles Spreadsheet
- 15FQ+ Feedback Report
- 15FQ+ Derived Dimensions Report
- 15FQ+ Question Prompts Report
- 15FQ+ Competency Development
- 15FQ+ Competency Selection
- 15FQ+ Competency Spreadsheet
- 15FQ+ Extended Report
- 15FQ+ Extended Results Spreadsheet
- 15FQ+ Extended Group Report
- 15FQ+ Derailers Report
- 15FQ+ Derailers Results Spreadsheet
- 15FQ+ Emotional Intelligence Report
- 15FQ+ Emotional Intelligence Spreadsheet
- 15FQ+ Conflict Handling Styles
- 15FQ+ Coaching (GROW Model)
- 15FQ+ Coaching (Competency Model)

<u>15FQ+ Standard Report Set</u>

- 15FQ+ Standard Report
- 15FQ+ Profiles Report
- 15FQ+ Ideal Profiles Report
- 15FQ+ Ideal Profiles Spreadsheet
- 15FQ+ Feedback Report
- 15FQ+ Derived Dimensions Report
- 15FQ+ Question Prompts Report
- 15FQ+ Competency Results Spreadsheet
- 15FQ+ Extended Report
- 15FQ+ Extended Results Spreadsheet
- 15FQ+ Extended Group Report
- 15FQ+ Derailers Results Spreadsheet
- 15FQ+ Emotional Intelligence Spreadsheet
- 15FQ+ Coaching (GROW Model)
- 15FQ+ Coaching (Competency Model)

15FQ+ Advanced Report Set

- 15FQ+ Derailers Report
- 15FQ+ Derailers Results Spreadsheet
- 15FQ+ Emotional Intelligence Report
- 15FQ+ Emotional Intelligence Spreadsheet
- 15FQ+ Conflict Handling Styles Report
- 15FQ+ Derailers Report
- 15FQ+ Competency Selection Report
- 15FQ+ Competency Development Report
- 15FQ+ Competency Results Spreadsheet
- 15FQ+ Coaching (Competency Model)
- 15FQ+ Coaching (GROW Model)

15FQ+ Coaching Report Set

- 15FQ+ Coaching Reports (GROW Model)
- 15FQ+ Coaching Report (Competency Model)

Computer-generated reports are intended to support, not replace, professional interpretation. Practitioners are expected to evaluate report outputs critically, considering contextual information and corroborating evidence.

Principles of Interpretation

Interpretation of 15FQ+ scores is norm-referenced and should always be conducted with reference to the appropriate comparison group. Scores reflect relative standing rather than absolute levels of personality traits. Practitioners are cautioned against trait reification, whereby scale scores are treated as fixed or deterministic attributes. Personality traits should instead be understood as probabilistic tendencies that may vary across contexts and over time. Meaningful interpretation requires integration of test results with other sources of information, including interviews, behavioural observations, and relevant background data.

Feedback and Use of Results

Feedback should be provided by suitably qualified practitioners in a manner that is ethically sound, respectful, and appropriate to the assessment context. A validation interview is recommended to confirm the plausibility of results and to explore situational influences on responding. The nature and depth of feedback will differ across developmental and selection contexts. In all cases, feedback should focus on enhancing understanding and supporting responsible decision-making, rather than labelling or categorising individuals.

Ethical and Professional Considerations

Use of the 15FQ+ must comply with the ethical requirements of the British Psychological Society (BPS) and, where applicable, the Health and Care Professions Council (HCPC), as well as relevant legislation governing data protection and professional conduct. In the UK, the processing of personal data obtained through psychometric assessment is governed by the UK General Data Protection Regulation (UK GDPR) and the Data Protection Act 2018. Practitioners are responsible for ensuring that assessment data are collected, stored, and used in accordance with these requirements, including obtaining informed consent, limiting data use to the stated assessment purpose, and ensuring secure storage and appropriate retention periods. Practitioners are also responsible for ensuring sensitivity to cultural and language factors that may influence assessment outcomes. Where assessment conditions fall outside recommended parameters, caution should be exercised in interpreting and applying results.

PSYCHOMETRIC PROPERTIES

Sample Description

The UK sample used for the analyses reported in this manual consisted of 4,051 adult respondents who completed the 15FQ+ across a range of occupational, developmental, and research contexts between January 2020 and December 2025. Data cleaning and quality assurance procedures were applied to this sample extracted from the GeneSys platform prior to analysis. Respondents with missing or incomplete 15FQ+ administrations were excluded from all consequent analyses, and cases with missing biographical information were excluded only where subgroup analyses or group comparisons were required. Group categorisation followed conventions applied by the established Census guidelines (Office for National Statistics, 2021). Table 6 presents the demographic composition of the final sample.

Table 6. Sample Demographics

Variable	N	%
Gender		
Male	2310	57.0
Female	1666	41.1
Not reported	75	1.9
Ethnicity		
White	2389	59.0
Asian / Indian	568	14.0
Black	96	2.4
Mixed Race	1	0.0
Not reported	997	24.6
First Language		
English	2948	72.8
Arabic	97	2.4
Hindi-Urdu	80	2.0
Maltese	45	1.1
Other First Languages (>1% representation)	376	9.3
Not reported	515	12.7
Education		
University Bachelor Degree	811	20.0
Masters	740	18.3
Professional Qualification	601	14.8
Bachelor Honours	436	10.8
Secondary School	348	8.6
Postgraduate Diploma/Certificate	275	6.8
Tertiary Diploma/Certificate	171	4.2
Industry or Trade Training	135	3.3
Doctorate	55	1.4
Not reported	479	11.8

Job Area		
Manager	1780	43.9
Professional	1043	25.7
Technician or associate profession	154	3.8
Service or sales worker	133	3.3
Clerical support	43	1.1
Skilled agricultural or fishery worker	22	0.5
Craft or related trades	21	0.5
Armed forces	17	0.4
Elementary occupations	10	0.2
Plant or machine operator	9	0.2
Other	201	5.0
Not reported	618	15.3

Note. N = sample size; % = percentage of cases in sample.

A notable proportion of respondents did not complete all biographical questions, a pattern commonly observed in organisational and developmental assessment contexts, where disclosure of personal demographic information is voluntary and individuals may exercise discretion regarding data sharing. Data protection frameworks such as the UK General Data Protection Regulation (UK GDPR, 2021) support respondents' rights to withhold personal information, and non-disclosure does not preclude valid test administration or interpretation.

Gender representation in the sample showed a moderate male predominance, with 57.0% of respondents identifying as male and 41.1% as female, while a small proportion (1.9%) did not report gender. This distribution is broadly consistent with samples drawn from managerial, professional, and technical occupational groups, which remain male-skewed in many UK labour market sectors.

Ethnicity was not reported by approximately one quarter of respondents (24.6%). Among those who did provide ethnicity data, the majority identified as White (59.0%), followed by Asian/Indian respondents (14.0%), with smaller representations of Black (2.4%) and Mixed ethnicity respondents. While incomplete, this distribution is broadly aligned with UK census-based workforce patterns, particularly within professional and managerial populations, although minority ethnic groups are likely underrepresented relative to the general population.

First language was reported by the majority of respondents. English was the dominant first language (72.8%). Among non-English first language speakers, Arabic (2.4%), Hindi-Urdu (2.0%), and Maltese (1.1%) were the only language groups exceeding 1% representation. All remaining first languages, each comprising less than 1% of the sample, were combined into a single category. A proportion of respondents (12.7%) did not report first language. Given the small size of individual non-English language groups, language-based analyses compare

English First Language and Non-English First Language respondents, with cases where language was not reported excluded from group comparisons.

Educational attainment within the sample indicates a relatively highly educated respondent group. Among those who reported education, most had completed undergraduate or postgraduate qualifications, professional certifications, or honours-level degrees. This profile is consistent with recommended usage guidelines for the 15FQ+, which assume a level of educational attainment sufficient to support accurate comprehension of item content and response demands.

Occupationally, the sample was weighted toward management (43.9%) and professional roles (25.7%), with additional representation across technical, service and sales, clerical, skilled trades, and other occupational categories. Although a proportion of respondents did not report job area (15.3%), the overall distribution reflects the primary contexts in which the 15FQ+ is applied in the UK, namely managerial assessment, professional development, and organisational research. This breadth supports the relevance of the UK norms and analyses for use across a range of organisational and occupational settings.

Group Mean Comparisons

Prior to conducting group mean comparisons on the gender (female/male), ethnic (White/Other Ethnicities), and language (English first language/non-English first language), the assumption of homogeneity of variances was evaluated using Levene's test.

Given the very large sample sizes, Levene's tests indicated statistically significant variance differences across groups, likely reflecting sensitivity to minor variance deviations rather than substantively meaningful heteroscedasticity. Nevertheless, Welch's t-tests are reported below to provide robust estimates that do not assume equal variances. Welch's t-test adjusts the degrees of freedom to account for unequal variances and unequal sample sizes, providing a more robust comparison than the standard Student's t-test. In interpreting the results, the direction of the mean difference indicates which group scored higher: positive Cohen's d values indicate that the first group reported scored higher, while negative values indicate that the second group reported scored higher. Effect sizes are interpreted using Cohen's conventions: small (~0.2), medium (~0.5), and large (~0.8), which reflect the practical magnitude of the differences (Hedges, 2024).

Mean differences across gender groups

Table 7. Gender group mean differences

Scale	Male (n = 2 310)		Female (n = 1 666)		*t*	*df*	*d*
	Mean	SD	Mean	SD			
*f*A	18.79	3.82	20.97	2.72	21.07*	3 973	0.66
ß	20.17	3.99	19.37	4.55	-5.78*	3 292	-0.19
*f*C	17.81	4.97	16.71	5.45	-6.49*	3 383	-0.21
*f*E	15.20	4.45	13.60	4.69	-10.89*	3 473	-0.35
*f*F	14.76	5.49	15.74	5.21	5.73*	3 693	0.18
*f*G	19.17	4.87	19.40	4.67	1.52	3 671	0.05
*f*H	15.61	6.26	14.70	6.30	-4.51*	3 575	-0.14
*f*I	12.61	4.72	17.34	3.81	34.90*	3 923	1.10
*f*L	6.19	5.01	5.70	4.90	-3.05*	3 636	-0.10
*f*M	9.54	4.17	9.59	4.47	0.37	3 434	0.01
*f*N	19.29	4.46	19.78	4.26	3.53*	3 678	0.11
*f*O	11.66	6.14	14.12	6.43	12.13*	3 488	0.39
*f*Q1	8.22	4.63	8.58	4.47	2.46*	3 659	0.08
*f*Q2	7.44	4.85	7.31	4.80	-0.81	3 606	-0.03
*f*Q3	19.23	4.05	17.89	4.38	-9.76*	3 417	-0.32
*f*Q4	7.67	5.5	8.21	5.95	2.92*	3 415	0.09

Note. * p < .05. *t* = Welch's t-statistic; *df* = degrees of freedom; *d* = Cohen's *d* effect size

Although a number of the t-tests reported in Table 7 reached statistical significance, this outcome is expected given the substantial sample sizes and should not be interpreted as evidence of widespread meaningful gender differences. Examination of effect sizes indicates that practically meaningful differences were confined to a small subset of scales.

Only two scales show differences of clear practical relevance. Tender-minded (*f*I) demonstrated a very large gender difference (*d* = 1.10), with females scoring substantially higher than males. This represents a robust and meaningful effect, consistent with established findings on gender differences in emotional sensitivity, empathy, and interpersonal awareness. Empathic (*f*A) also showed a medium-to-large effect (*d* = 0.66), again with higher female means, indicating a practically meaningful difference likely reflecting gender-linked tendencies toward empathic concern and affiliative orientation. A small-to-moderate effect was observed for Apprehensive (*f*O) (d = 0.39), suggesting moderately higher female scores on worry or self-doubt. While smaller than the effects for *f*A and *f*I, this difference may still warrant consideration in applied interpretation, particularly in contexts where emotional strain or stress sensitivity is relevant.

All remaining statistically significant differences were small in magnitude (|d| ≤ 0.35). Although statistically reliable, these effects are unlikely to reflect substantively meaningful gender differences in practical assessment contexts and are best interpreted as artefacts of

statistical power rather than indicators of distinct group profiles. Several scales showed no statistically or practically meaningful gender differences, further supporting the overall conclusion that gender effects are limited in scope.

Importantly, inspection of the group means, standard deviations, and score distributions suggests substantial overlap between male and female respondents across nearly all scales. Consequently, once raw scores are converted to standardised or norm-referenced scores, many of these small differences are likely to be attenuated or effectively neutralised. From an applied interpretation perspective, this reinforces the conclusion that only Empathic (*f*A) and Tender-minded (*f*I) clearly meet criteria for practical gender differentiation, with Self-Doubting (*f*O) representing a secondary, more modest effect.

Mean differences across ethnic groups

For the purposes of these analyses, the Other Ethnicities group comprises respondents who identified as Asian, Black, or Mixed race. As with the gender comparisons, the Welch's t-tests reported in Table 8 indicated several statistically significant differences across groups, which is not unexpected given the large sample sizes. Interpretation therefore focuses on effect sizes as indicators of practical relevance.

Table 8. Ethnic group mean differences

Scale	White (n = 2 389)		Other Ethnicities (n = 665)		t	df	*d*
	Mean	SD	Mean	SD			
*f*A	19.70	3.78	19.54	2.99	-1,22	1 313	-0,05
ß	19.84	4.33	19.78	3.98	-0,32	1 138	-0,01
*f*C	17.44	5.23	17.03	5.04	-1,87	1 094	-0,08
*f*E	14.14	4.80	15.31	4.01	6,32*	1 245	0,26
*f*F	15.60	5.42	14.10	5.04	-6,66*	1 127	-0,29
*f*G	19.08	4.94	20.34	4.01	6,78*	1 279	0,28
*f*H	14.97	6.45	16.14	5.86	4,45*	1 151	0,19
*f*I	14.04	5.06	15.50	4.43	7,29*	1 189	0,31
*f*L	4.85	4.49	8.84	5.13	18,23*	966	0,83
*f*M	9.36	4.39	9.78	3.44	2,64*	1 325	0,11
*f*N	19.37	4.63	19.90	3.48	3,17*	1 386	0,13
*f*O	13.02	6.65	11.55	5.62	-5,69*	1 229	-0,24
*f*Q1	7.90	4.46	8.95	4.44	5,40*	1 068	0,24
*f*Q2	7.05	4.86	8.25	4.55	5,92*	1 123	0,25
*f*Q3	18.30	4.32	20.53	3.13	14,85*	1 443	0,59
*f*Q4	7.82	5.82	7.54	5.08	-1,26	1 195	-0,05

Note. * p < .05. *t* = Welch's t-statistic; *df* = degrees of freedom; *d* = Cohen's *d* effect size

Across most scales, observed differences were small in magnitude (d < 0.30), indicating limited practical differentiation between White respondents and respondents from other ethnic backgrounds. One notable exception was observed for Suspicious (*f*L), which showed a large effect size (*d* = 0.83), with respondents from Other Ethnicities scoring substantially higher than White respondents. This represents a difference of clear practical significance and may reflect heightened interpersonal caution, mistrust, or guardedness. Such differences should be interpreted carefully within their broader socio-cultural and contextual framework, particularly given the heterogeneity of the comparison group and the potential influence of minority status, perceived discrimination, or contextual uncertainty in applied assessment settings.

A moderate effect was also evident for Self-disciplined (*f*Q3) (*d* = 0.59), with higher scores among respondents from Other Ethnicities. This suggests a tendency toward greater behavioural regulation, conscientiousness, or persistence within this group, though the effect is smaller and less pronounced than that observed for *f*L.

Overall, the findings suggest that ethnic group differences in the UK sample are generally modest, with Suspicious (*f*L) standing out as the only scale demonstrating a difference of clear practical relevance, and Self-disciplined (*f*Q3) showing a secondary, moderate effect. These results support cautious interpretation of ethnic group differences and reinforce the appropriateness of broad, inclusive norms, while highlighting specific scales where contextual and cultural sensitivity is warranted in applied use.

Mean differences across language groups

As noted earlier, non-English first language (nEFL) respondents in the UK sample comprise individuals who reported a first language other than English. This distinction is analytically relevant given that the 15FQ+ is administered in English, and language-related differences may therefore reflect differential linguistic or cultural familiarity rather than substantive personality differences.

Overall, the language group differences reported in Table 9 are generally small in practical magnitude. The most notable difference was observed for Suspicious (*f*L), where non-English first language respondents scored higher than English first language respondents, yielding a moderate effect size (*d* = −0.50). This may reflect heightened interpersonal caution or guardedness among non-native English speakers, potentially attributable to cultural familiarity, minority status, or contextual uncertainty in assessment settings, rather than substantive personality differences per se. Small but statistically significant differences

were also observed for Dominant (*f*E, d = −0.36), with nEFL respondents scoring higher. While several other scales yielded statistically significant Welch's t-tests, this is partly attributable to the relatively large sample sizes. Most effect sizes fall within the small range (|d| < 0.30), suggesting that observed differences are unlikely to be meaningful at the individual interpretation level.

Table 9. Language group mean differences

Scale	EFL (n = 2 939)		nEFL (n = 597)		t	df	*d*
	Mean	SD	Mean	SD			
*f*A	19.70	3.63	19.58	3.30	0.79	914	0.03
ß	19.85	4.23	20.07	3.94	-1.20	897	-0.05
*f*C	17.35	5.20	17.61	4.86	-1.17	896	-0.05
*f*E	14.28	4.64	15.84	4.11	-8.26*	932	-0.36
*f*F	15.37	5.36	14.09	5.29	5.35*	862	0.24
*f*G	19.29	4.76	19.45	4.60	-0.77	874	-0.03
*f*H	15.21	6.34	15.50	6.02	-1.04	886	-0.05
*f*I	14.41	4.97	15.41	4.83	-4.57*	873	-0.20
*f*L	5.48	4.79	7.98	5.19	-10.89*	815	-0.50
*f*M	9.50	4.28	9.80	4.20	-1.61	866	-0.07
*f*N	19.50	4.44	19.93	3.81	-2.43*	956	-0.10
*f*O	12.82	6.51	11.98	5.86	3.15*	920	0.14
*f*Q1	8.04	4.50	9.30	4.48	-6.24*	859	-0.28
*f*Q2	7.22	4.79	7.80	4.67	-2.73*	870	-0.12
*f*Q3	18.68	4.22	19.12	4.20	-2.32*	859	-0.10
*f*Q4	7.79	5.71	8.09	5.39	-1.22	890	-0.05

Note. * p < .05. EFL = English first language; nEFL = non-English first language; *t* = Welch's t-statistic; *df* = degrees of freedom; *d* = Cohen's *d* effect size

Importantly, the majority of remaining scales showed negligible differences (|d| ≤ 0.10), indicating substantial overlap between the EFL and nEFL score distributions. As with results reported earlier, examination of raw score variability and effect sizes suggests that most observed differences are unlikely to persist once scores are transformed into norm-referenced metrics. These findings support the use of combined norms for most applied purposes, while highlighting Suspicious (fL) as a scale warranting particular contextual sensitivity when interpreting profiles of non-English first language respondents.

Internal Consistency Reliability

Internal consistency reliability estimates for the overall UK sample and for gender, ethnic (White vs. Other Ethnicities), and language (English first language vs. non-English first language) subgroups are presented in Table 9. Both Cronbach's alpha (α) and McDonald's omega (ω) are reported for completeness; however, interpretation prioritises ω due to its robustness to violations of tau-equivalence and its appropriateness for multidimensional personality constructs (Dunn et al., 2014). Given the heterogeneous item loadings typically observed in personality inventories, omega provides a more defensible estimate of internal consistency under applied measurement conditions than coefficient alpha (Cortina et al., 2020; Hayes & Coutts, 2020). Standard Error of Measurement (SEM) values are reported in raw-score units and reflect the expected dispersion of an observed score around an individual's true score due to measurement error (Musselwhite & Wesolowski, 2018).

For consistency with psychometric reporting conventions, SEMs in Table 10 are calculated using Cronbach's alpha. In operational 15FQ+ outputs generated via the GeneSys platform, SEM is displayed graphically as an error band around sten scores; this standardised presentation does not alter the underlying raw-score measurement precision.

Internal consistency estimates for 15FQ+ Form A

Table 10. Internal consistency reliability estimates for the 15FQ+ Form A primary scales

Scale	Males (n = 2 310)		Females (n = 1 666)		White (n = 2 389)		Other Ethnicities (n = 665)		EFL (n = 2 939)		nEFL (n = 597)		Overall (n = 4051)			
	α	ω	α	ω	α	ω	α	ω	α	ω	α	ω	α	ω	SD	SEM
*f*A	.68	.72	.59	.66	.74	.76	.52	.59	.70	.74	.62	.68	.69	.73	3.57	1.86
ß	.72	.73	.77	.77	.76	.77	.69	.70	.74	.75	.70	.71	.74	.75	4.25	2.12
*f*C	.79	.80	.83	.83	.81	.82	.79	.79	.81	.81	.78	.79	.81	.81	5.21	2.25
*f*E	.68	.68	.70	.70	.72	.72	.60	.60	.70	.70	.64	.64	.70	.70	4.63	2.55
*f*F	.75	.76	.75	.76	.77	.78	.70	.71	.75	.76	.73	.74	.75	.76	5.40	2.66
*f*G	.78	.79	.76	.77	.78	.79	.72	.74	.77	.78	.76	.77	.77	.78	4.79	2.25
*f*H	.83	.84	.83	.84	.85	.85	.80	.81	.84	.84	.81	.82	.83	.84	6.30	2.54
*f*I	.68	.68	.53	.54	.72	.72	.61	.61	.71	.71	.68	.68	.70	.70	4.95	2.70
*f*L	.76	.76	.77	.77	.75	.75	.72	.72	.76	.76	.74	.75	.77	.77	4.97	2.40
*f*M	.61	.63	.67	.69	.66	.68	.45	.48	.64	.65	.60	.63	.64	.65	4.30	2.54
*f*N	.74	.76	.74	.75	.77	.78	.60	.67	.75	.77	.67	.70	.74	.76	4.38	2.16
*f*O	.78	.79	.82	.83	.83	.83	.73	.74	.82	.82	.76	.76	.81	.81	6.38	2.78
*f*Q1	.67	.67	.68	.69	.69	.70	.58	.60	.68	.68	.60	.60	.67	.68	4.58	2.60
*f*Q2	.74	.74	.74	.74	.76	.77	.68	.69	.74	.75	.70	.71	.74	.74	4.83	2.46
*f*Q3	.69	.71	.70	.71	.70	.71	.58	.66	.70	.71	.73	.75	.70	.72	4.26	2.26
*f*Q4	.78	.79	.81	.82	.81	.82	.71	.72	.80	.81	.75	.76	.79	.80	5.69	2.54
SD	.67	.67	.71	.71	.68	.69	.66	.66	.69	.70	.65	.65	.68	.69	3.48	1.95
Median coefficient	**.74**	**.75**	**.75**	**.76**	**.76**	**.77**	**.68**	**.70**	**.75**	**.76**	**.72**	**.73**	**.74**	**.76**		

Note. *α* = Coefficient alpha; *ω* = McDonald's omega; EFL = English first language; nEFL = non-English first language

Across the overall UK sample, omega coefficients ranged from 0.65 to 0.84, with a median ω (excluding Social Desirability) of 0.76, indicating generally acceptable to good internal consistency across the primary scales. The strongest internal consistency was observed for Socially-bold (fH), Emotionally Stable (fC), Self-Doubt (fO), and Tense-driven (fQ4), all of which demonstrated ω coefficients at or above conventional acceptability thresholds. Lower, albeit still acceptable, coefficients were observed for Abstract (fM), Empathic (fA), and Tender-minded (fI), reflecting broader construct content and greater item heterogeneity rather than psychometric weakness. These patterns closely mirror international 15FQ+ findings and are theoretically consistent with the nature of these constructs.

Reliability estimates were highly comparable across gender groups, with near-identical median omega coefficients for males and females, supporting the stability of measurement precision across gender in the UK sample. Ethnic group comparisons showed slightly lower reliability coefficients for the “Other Ethnicities” group on several scales, most notably Abstract (fM) and Self-disciplined (fQ3). Similarly, language-based comparisons indicated modestly higher internal consistency among English first-language respondents relative to non-English first-language respondents on several scales. This pattern is commonly observed in English-language assessments and is likely attributable to differential language proficiency, educational exposure, or familiarity with test content rather than evidence of construct bias.

In evaluating measurement precision, SEM values were interpreted in conjunction with scale SDs and internal consistency estimates. Scales with comparatively larger SEMs, particularly those with lower ω coefficients, were flagged for cautious interpretation at the individual score level. This approach is intended as a contextual aid rather than a strict exclusion criterion and aligns with best practice in applied personality assessment.

Overall, the UK results indicate that the 15FQ+ primary scales demonstrate acceptable, stable, and largely invariant internal consistency across major demographic subgroups, supporting their use in applied assessment contexts within the UK, provided that results are interpreted with appropriate psychometric and contextual awareness.

Internal consistency estimates for 15FQ+ Form C

Table 11. Internal consistency reliability estimates for the 15FQ+ Form C

Scale	Males (n = 2 310)		Females (n = 1 666)		White (n = 2 389)		Other Ethnicities (n = 665)		EFL (n = 2 939)		nEFL (n = 597)		Overall (n = 4051)			
	α	ω	α	ω	α	ω	α	ω	α	ω	α	ω	α	ω	SD	SEM
*f*A	.64	.67	.52	.60	.74	.76	.52	.59	.65	.69	.55	.59	.63	.67	2.27	1.31
ß	.57	.59	.63	.65	.76	.77	.69	.70	.61	.63	.52	.54	.60	.62	2.41	1.49
*f*C	.59	.63	.63	.66	.81	.82	.79	.79	.61	.65	.58	.61	.61	.65	2.87	1.71
*f*E	.59	.59	.59	.59	.72	.72	.60	.60	.59	.59	.54	.54	.60	.60	2.79	1.77
*f*F	.61	.62	.63	.63	.77	.78	.70	.71	.61	.62	.61	.63	.61	.62	3.17	1.94
*f*G	.53	.53	.50	.51	.78	.79	.72	.74	.52	.52	.46	.47	.52	.52	2.52	1.74
*f*H	.73	.74	.74	.75	.85	.85	.80	.81	.74	.75	.69	.70	.74	.74	3.59	1.82
*f*I	.54	.55	.47	.49	.72	.72	.61	.61	.54	.56	.48	.49	.53	.54	2.67	1.8
*f*L	.55	.56	.58	.59	.75	.75	.72	.72	.54	.56	.55	.57	.56	.57	2.54	1.66
*f*M	.47	.50	.48	.52	.66	.68	.45	.48	.46	.50	.46	.50	.47	.50	2.40	1.69
*f*N	.62	.64	.65	.66	.77	.78	.60	.67	.66	.68	.53	.54	.64	.65	2.85	1.69
*f*O	.62	.63	.66	.66	.83	.83	.73	.74	.67	.67	.62	.62	.65	.66	3.34	1.96
*f*Q1	.60	.60	.61	.62	.69	.70	.58	.60	.61	.62	.56	.57	.60	.61	3.07	1.91
*f*Q2	.67	.69	.66	.67	.76	.77	.68	.69	.67	.69	.63	.65	.67	.68	3.05	1.72
*f*Q3	.49	.53	.47	.52	.70	.71	.58	.66	.47	.52	.53	.57	.49	.53	2.24	1.53
*f*Q4	.70	.71	.75	.76	.81	.82	.71	.72	.72	.73	.70	.71	.72	.73	3.21	1.68
Median coefficient	**.59**	**.61**	**.62**	**.63**	**.76**	**.77**	**.68**	**.70**	**.61**	**.62**	**.55**	**.57**	**.61**	**.62**		

Note. *α* = Coefficient alpha; *ω* = McDonald's omega; EFL = English first language; nEFL = non-English first language

Internal consistency reliability estimates for the UK 15FQ+ Form C (short form) across gender, ethnic, and language subgroups are presented in Table 11. As with Form A, both Cronbach's alpha (α) and McDonald's omega (ω) are reported, with interpretive emphasis placed on omega due to its robustness to violations of tau-equivalence and its appropriateness for multidimensional personality constructs. This consideration is particularly salient for Form C, where item reduction amplifies the impact of heterogeneous factor loadings on coefficient alpha.

Across the overall UK sample, omega coefficients for Form C range from ω = .50 to .74, with a median ω of .62, reflecting a systematic reduction in internal consistency relative to Form A. This pattern is expected and theoretically consistent with classical test theory, as reliability is directly constrained by test length. The observed coefficients therefore reflect the abbreviated nature of Form C rather than deficiencies in item quality or construct representation.

Scales assessing more narrowly defined or behaviourally cohesive constructs, such as Socially-bold (ƒH), Self-Doubt (ƒO), and Tense-driven (ƒQ4), retain comparatively stronger internal consistency, with omega values approaching or exceeding .70 in the overall sample

and across most subgroups. In contrast, broader constructs, such as Abstract (fM), Tender-minded (fI), and Self-Discipline (fQ3), show lower reliability coefficients, reflecting the combined effects of construct breadth and item reduction. These patterns mirror those observed for Form A but are accentuated in the short form.

Reliability estimates are reasonably stable across gender groups, with minimal systematic divergence between males and females. Ethnic and language subgroup analyses show a consistent tendency for higher internal consistency among White and English first-language (EFL) respondents compared to Other Ethnicity and non-English first-language (nEFL) groups. As with Form A, this pattern is likely attributable to differences in language proficiency, educational exposure, and familiarity with English-administered assessment content rather than substantive construct bias, particularly given that Form C retains fewer contextual cues per construct.

Standard Errors of Measurement (SEM), calculated using Cronbach's alpha and expressed in raw-score units, are uniformly larger relative to scale score ranges than those observed for Form A. This indicates reduced measurement precision at the individual score level, a known and unavoidable consequence of abbreviated forms. As with Form A, SEM values are presented transparently in raw-score units, while operational practitioner reports display measurement error graphically around standardised (sten) scores.

Taken together, the results indicate that Form C demonstrates acceptable internal consistency for its intended purpose as a brief screening or exploratory instrument, suitable for large-scale surveys, research contexts, and early-stage assessment where administration efficiency is prioritised. However, the lower reliability coefficients and larger SEMs relative to Form A underscore that Form C is not intended for fine-grained individual interpretation or high-stakes decision-making. Where detailed profiling, developmental feedback, or selection decisions are required, Form A remains the psychometrically preferable option.

Internal consistency across verbal reasoning levels

To further explore the conditions under which the 15FQ+ demonstrates optimal measurement precision, internal consistency McDonald's ω coefficients were examined across stanine bands of verbal reasoning ability in an international sample, as measured by the GRT2. These coefficients are reported in Table 12.

Table 12. Internal Consistency of the 15FQ+ Across Verbal Reasoning Stanines

	GRT2 stanine								
	1 (n=251)	**2 (n=699)**	**3 (n=2111)**	**4 (n=3665)**	**5 (n=4445)**	**6 (n=4138)**	**7 (n=3096)**	**8 (n=1960)**	**9 (n=1391)**
*f*A	.62	.47	.54	.60	.66	.67	.74	.73	.78
ß	.66	.65	.66	.68	.69	.70	.70	.70	.70
*f*C	.77	.72	.75	.76	.78	.79	.79	.80	.79
*f*E	.56	.47	.56	.57	.61	.67	.68	.71	.71
*f*F	.72	.70	.71	.72	.74	.75	.75	.76	.78
*f*G	.62	.59	.59	.67	.72	.72	.75	.76	.79
*f*H	.76	.75	.75	.78	.79	.81	.82	.83	.84
*f*I	.54	.59	.61	.65	.66	.69	.70	.69	.71
*f*L	.63	.58	.59	.64	.67	.69	.72	.73	.76
*f*M	.52	.40	.50	.46	.46	.56	.62	.66	.70
*f*N	.76	.60	.65	.64	.66	.70	.73	.71	.74
*f*O	.66	.68	.67	.69	.72	.76	.78	.80	.80
*f*Q1	.42	.43	.42	.41	.55	.62	.67	.72	.76
*f*Q2	.71	.65	.67	.68	.72	.73	.74	.75	.79
*f*Q3	.70	.40	.39	.45	.49	.56	.60	.65	.72
*f*Q4	.59	.56	.59	.63	.69	.74	.77	.79	.79
Median	**.65**	**.59**	**.60**	**.65**	**.68**	**.70**	**.74**	**.73**	**.77**

Median McDonald's omega coefficients showed a clear increase across verbal reasoning levels, rising from ω = .65 at Stanine 1 to ω = .77 at Stanine 9. This pattern was observed consistently across primary personality factors. Lower internal consistency at the lowest stanine levels likely reflects increased random responding, reduced item comprehension, or greater heterogeneity in response processes among individuals with limited verbal reasoning capacity. In contrast, reliability estimates were strongest among respondents scoring in the average to above-average verbal reasoning range, which is consistent with the intended occupational and professional assessment context of the 15FQ+.

These findings do not suggest construct bias but rather highlight the importance of interpreting personality scale reliability within the cognitive and linguistic demands of the instrument. The results align with established psychometric principles, indicating that self-report personality measures relying on nuanced verbal descriptors function most reliably among respondents with sufficient verbal comprehension skills.

Test-Retest Reliability

Test–retest reliability was examined to evaluate the temporal stability of the 15FQ+ primary scales using respondents who completed the 15FQ+ on more than one occasion between 2020 and 2025. Short- and long-term test–retest coefficients are presented in Table 13.

Table 13. Test-retest reliability of the 15FQ+ primary scales

	2-4 weeks (n = 134)	6-12 months (n = 149)
*f*A	.70	.48
ß	.75	.57
*f*C	.72	.57
*f*E	.72	.58
*f*F	.81	.47
*f*G	.69	.45
*f*H	.74	.59
*f*I	.70	.64
*f*L	.59	.61
*f*M	.57	.55
*f*N	.67	.65
*f*O	.65	.54
*f*Q1	.67	.48
*f*Q2	.68	.59
*f*Q3	.74	.51
*f*Q4	.72	.58
Median	**.70**	**.57**

Note. Values represent Pearson correlations between Time 1 and Time 2 scores.

Short-term stability was assessed using data from 134 respondents who re-completed the 15FQ+ within a 2–4 week interval. Test–retest correlations over this interval were consistently strong across scales, with coefficients ranging from r = .57 to .81 and a median correlation of .70. These values indicate good short-term temporal stability and suggest that observed scores are not unduly influenced by transient states, response inconsistency, or short-term situational factors.

Long-term stability was evaluated using data from 149 respondents who completed the 15FQ+ again after a 6–12 month interval. As expected, correlations over this extended period were more moderate, ranging from r = .45 to .65, with a median correlation of .57. This pattern is theoretically consistent with personality research demonstrating substantial rank-order stability alongside meaningful intra-individual change across longer time horizons, particularly in applied occupational and developmental contexts (Terracciano et al., 2010).

Across both intervals, traits reflecting emotional regulation and interpersonal style (e.g., ƒH, ƒI, ƒN) tended to show comparatively higher long-term stability, whereas traits more sensitive to contextual demands or motivational shifts (e.g., ƒF, ƒG, ƒQ1) exhibited greater attenuation over time. Importantly, no scale demonstrates instability inconsistent with its theoretical positioning within the 15FQ+ framework.

The observed pattern of higher short-term stability with attenuated but meaningful long-term correlations closely mirrors results from other well-established personality inventories used in occupational assessment. From an applied perspective, these results justify the reporting of both short- and long-term test–retest reliability, as each interval addresses different psychometric and interpretive questions: short-term coefficients inform score dependability and measurement consistency, while longer-term coefficients align with theoretical expectations regarding personality stability and change in real-world work contexts. Collectively, these findings support the 15FQ+ as a measure of relatively enduring personality dispositions while remaining sensitive to genuine developmental, role-related, and contextual change over time.

Equivalence Reliability

To evaluate alternate-form equivalence between the standard (Form A) and shortened (Form C) versions of the 15FQ+ in the UK context, correlations were computed for the primary scales. As Form C items are a subset of those included in Form A, uncorrected correlations are expected to be elevated due to shared item content and should therefore be regarded as upper-bound estimates of the association between the two forms. To estimate the underlying true-score relationship between Forms A and C, attenuation-corrected correlations (Levy, 1967) were computed using McDonald's omega coefficients for each form.

However, across all primary scales, the corrected correlations exceeded unity, reflecting the combination of very high observed correlations and the comparatively lower internal consistency estimates associated with the shortened form. In accordance with classical test theory conventions, correlations greater than 1.00 are interpreted as indicating that the true-score correlation between the forms approaches 1.00 rather than representing a literal statistical value. For this reason, and consistent with best psychometric practice, interpretive emphasis is placed only on the uncorrected coefficients, as reflected in Table 13.

Table 14. Uncorrected correlations between 15FQ+ Form A and Form C

Scale	Correlation (uncorrected)
*f*A	.87
ß	.84
*f*C	.94
*f*E	.85
*f*F	.88
*f*G	.91
*f*H	.92
*f*I	.90
*f*L	.92
*f*M	.85
*f*N	.83
*f*O	.92
*f*Q1	.81
*f*Q2	.91
*f*Q3	.87
*f*Q4	.90
Median	.89

The uncorrected correlations, which may be interpreted as estimates of alternate-form reliability, were uniformly high across the 16 primary scales, ranging from r = .81 to .94, with a median correlation of .89. These results indicate a strong degree of score correspondence between Forms A and C and suggest that the shortened form retains the substantive measurement properties of the full version.

Overall, the findings provide strong evidence of alternate-form equivalence between the English versions of Forms A and C. Despite the expected reduction in internal consistency for the shortened form, the magnitude and consistency of the uncorrected correlations indicate that Form C captures essentially the same underlying constructs as Form A.

From an applied perspective, these results support the use of Form C as a psychometrically comparable short form in the UK context, particularly for screening, large-scale, or high-throughput assessment settings where testing time is constrained. Nevertheless, consistent with both theoretical expectations and international 15FQ+ guidance, Form A remains preferable for comprehensive individual assessment, feedback, and high-stakes decision-making, where maximal measurement precision is required.

Structural Validity

Given that the 15FQ+ is an established instrument developed in the UK with a clearly specified primary and higher-order factor structure, exploratory re-examination of the latent structure was not undertaken. Instead, structural validity was evaluated using confirmatory factor analytic methods, supplemented by examination of inter-factor correlations to ensure that the 16 factors were relatively independent. This approach is consistent with contemporary psychometric practice for well-validated personality measures and allows for direct testing of the hypothesised structure and its equivalence across demographic subgroups.

Structural Equivalence across Demographics

Confirmatory factor analyses (CFAs) were conducted to rigorously test the fit of the hypothesised factor structure and to evaluate cross-group model fit consistency across key demographic subgroups, including gender, ethnicity, and language. This step ensures that the instrument functions consistently across different segments of the local sample, providing evidence for the cross-group applicability of the 15FQ+ and a robust foundation for subsequent validity interpretations (Gomez-Benito et al., 2018; Van der Vijver & Leung, 2011).

The results of confirmatory factor analyses (CFAs) for the primary and global scales of the 15FQ+ are presented in Tables 15 to 30 that follow. CFA models were specified such that items loaded only onto their intended latent factors, in accordance with the theoretical structure of the 15FQ+. Analyses were conducted separately for the overall sample and for relevant subgroups defined by gender, ethnic group, and language background, to assess the consistency of model fit and provide evidence of structural equivalence across groups.

All CFAs were conducted in R using the lavaan package (Rosseel, 2012). Model fit was evaluated using multiple fit indices, including the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), Root Mean Square Error of Approximation (RMSEA), and Standardised Root Mean Square Residual (SRMR), in line with current best-practice guidelines for structural equation modelling (Brown, 2015). The chi-square (χ^2) statistic was also reported for completeness, but was interpreted cautiously given its well-documented sensitivity to sample size. In large samples, such as those used for the current local 15FQ+ validation, even well-fitting models may yield statistically significant χ^2 values, and accordingly, χ^2 was not used as the primary criterion for model evaluation.

In interpreting overall model fit, commonly accepted guideline values were used rather than rigid cut-offs. CFI and TLI values of approximately 0.80 or higher were considered informative, 0.90 or higher were taken to indicate acceptable fit, with values of 0.95 or higher reflecting good fit. RMSEA values of 0.08 or lower were considered indicative of acceptable fit, and values of 0.05 or lower indicative of good fit. SRMR values below 0.08 were regarded as reflecting acceptable residual fit. Model evaluation was conducted holistically, with emphasis placed on convergence across multiple fit indices rather than reliance on any single statistic, particularly given the large sample sizes involved (Cheung & Rensvold, 2002; Goretzko et al., 2024; Hu & Bentler, 1999).

Primary Factors

Empathic (fA).

Table 15. Empathic (fA): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	849.14	54	.88	.85	.06	.04
Male (n = 2,310)	314.30	108	.87	.85	.06	.04
Female (n = 1,666)	218.02	108	.87	.85	.06	.04
White (n = 2,389)	411.13	132	.87	.84	.06	.04
Non-White (n = 665)	117.43	132	.87	.84	.06	.04
English (n = 2,939)	436.80	108	.88	.85	.06	.04
Not English (n = 597)	127.87	108	.88	.85	.06	.04

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

The Empathic (fA) CFAs demonstrated in Table 15 show acceptable model fit. The overall model demonstrated acceptable absolute and residual fit, with RMSEA = .06 and SRMR = .04. Incremental fit indices were below conventional .90 benchmarks (CFI = .88; TLI = .85), indicating marginal-to-adequate incremental fit relative to the independence model. The similarity of fit indices across demographic groups also suggests that the hypothesised structure of the Empathic scale is replicated with reasonable consistency in the UK sample. While incremental fit indices fall slightly below conventional .90 criteria, the convergence of RMSEA and SRMR values, together with the stability of model fit across groups, provides evidence supporting structural replication of the intended factor structure across demographic subgroups.

Intellectance (ß).

Table 16. Intellectance (ß): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	2213.55	54	.72	.66	.10	.07
Male (n = 2,310)	882.11	108	.72	.66	.10	.07
Female (n = 1,666)	632.28	108	.72	.66	.10	.07
White (n = 2,389)	787.41	132	.76	.70	.09	.06
Non-White (n = 665)	250.88	132	.76	.70	.09	.06
English (n = 2,939)	1107.33	108	.72	.65	.10	.07
Not English (n = 597)	277.89	108	.72	.65	.10	.07

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

The CFAs for Intellectance (β), presented in Table 16, show consistently similar patterns of model fit across all demographic groups, with RMSEA and SRMR values falling within acceptable ranges. Although CFI and TLI values were below conventional thresholds for good fit, this pattern supports structural replication across groups, while indicating that the same latent structure is being consistently estimated.

Emotionally Stable (fC).

Table 17. Emotionally Stable (fC): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	856.11	54	.92	.90	.06	.04
Male (n = 2,310)	425.31	108	.92	.90	.06	.04
Female (n = 1,666)	311.09	108	.92	.90	.06	.04
White (n = 2,389)	467.04	132	.91	.89	.06	.04
Non-White (n = 665)	184.20	132	.91	.89	.06	.04
English (n = 2,939)	508.50	108	.92	.90	.06	.04
Not English (n = 597)	169.55	108	.92	.90	.06	.04

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

As shown in Table 17, the Emotionally Stable (fC) CFAs demonstrated acceptable overall model fit. Absolute and residual fit indices support the adequacy of the model, with RMSEA values reflecting moderate approximate fit and SRMR values indicating good residual fit. Incremental fit indices (CFI and TLI) are at or near conventional benchmarks for acceptable fit and demonstrate a consistent pattern across groups. Importantly, the stability of fit indices across gender, ethnic, and language subgroups suggests that the single-factor structure is replicated consistently within each demographic category.

Dominant (fE).

Table 18. Dominant (fE): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	948.30	54	.82	.78	.06	.05
Male (n = 2,310)	521.04	108	.81	.77	.06	.05
Female (n = 1,666)	418.08	108	.81	.77	.06	.05
White (n = 2,389)	510.17	132	.84	.81	.06	.04
Non-White (n = 665)	167.17	132	.84	.81	.06	.04
English (n = 2,939)	622.90	108	.82	.78	.06	.04
Not English (n = 597)	167.09	108	.82	.78	.06	.04

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

The CFA results for Dominant (fE), reported in Table 18, indicate moderate model fit, with RMSEA and SRMR values consistently within acceptable ranges across all groups. Although CFI and TLI values were slightly below conventional cut-offs for good fit, these indices showed minimal variation across demographic groups. The similarity of fit statistics across subgroups suggests that the same latent structure is being estimated in each group.

Enthusiastic (fF).

Table 19. Enthusiastic (fF): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	2,519.77	54	.70	.64	.11	.08
Male (n = 2,310)	144.84	108	.71	.64	.10	.07
Female (n = 1,666)	837.57	108	.71	.64	.10	.07
White (n = 2,389)	1,095.69	132	.76	.71	.09	.06
Non-White (n = 665)	375.39	132	.76	.71	.09	.06
English (n = 2,939)	1,627.01	108	.72	.65	.10	.07
Not English (n = 597)	371.58	108	.72	.65	.10	.07

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

Table 19 presents the CFA results for Enthusiastic (fF), which show modest overall model fit, characterised by lower CFI and TLI values but acceptable SRMR values across all demographic groups. However, the pattern of fit indices was highly consistent across gender, ethnic, and language groups. This uniformity indicates that the Enthusiastic scale operates with a comparable underlying structure across groups, supporting structural equivalence despite weaker global fit.

Conscientious (fG).

Table 20. Conscientious (fG): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	100.23	54	.89	.86	.07	.05
Male (n = 2,310)	406.72	108	.88	.86	.07	.04
Female (n = 1,666)	393.97	108	.88	.86	.07	.04
White (n = 2,389)	539.05	132	.87	.84	.07	.05
Non-White (n = 665)	130.59	132	.87	.84	.07	.05
English (n = 2,939)	625.31	108	.88	.86	.07	.04
Not English (n = 597)	86.12	108	.88	.86	.07	.04

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

The CFAs for Conscientious (fG) shown in Table 20 demonstrated close to acceptable model fit across all demographic groups, with CFI and TLI values near 0.90 and low RMSEA and SRMR values. Fit indices were highly consistent across groups, indicating that the intended factor structure of the Conscientious scale is robustly replicated. These findings provide strong evidence for structural equivalence across gender, ethnic, and language groups.

Socially-Bold (fH).

Table 21. Socially Bold (fH): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	1,649.26	54	.87	.84	.09	.05
Male (n = 2,310)	744.62	108	.87	.84	.09	.05
Female (n = 1,666)	708.16	108	.87	.84	.09	.05
White (n = 2,389)	867.68	132	.88	.85	.09	.05
Non-White (n = 665)	256.31	132	.88	.85	.09	.05
English (n = 2,939)	1,138.10	108	.87	.84	.09	.05
Not English (n = 597)	218.03	108	.87	.84	.09	.05

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

As reported in Table 21, the Socially-Bold (fH) CFAs yielded acceptable model fit, with RMSEA and SRMR values close to recommended ranges and consistent CFI and TLI values across all groups. Although overall fit was slightly below optimal thresholds, the stability of fit indices across demographic groups indicates that the factor structure is consistently reproduced, supporting structural equivalence.

Tender-minded (fI).

Table 22. Tender-minded (fI): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	145.95	54	.74	.69	.08	.06
Male (n = 2,310)	643.24	108	.74	.68	.07	.05
Female (n = 1,666)	379.73	108	.74	.68	.07	.05
White (n = 2,389)	935.23	132	.74	.68	.08	.06
Non-White (n = 665)	221.97	132	.74	.68	.08	.06
English (n = 2,939)	1,056.38	108	.75	.70	.08	.06
Not English (n = 597)	188.23	108	.75	.70	.08	.06

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

The CFA results for Tender-minded (fI) presented in Table 22 show modest overall model fit, with RMSEA and SRMR values within acceptable limits but lower CFI and TLI values. Importantly, these fit indices were highly similar across gender, ethnic, and language groups, suggesting that the same latent structure is being estimated in each group. This consistency supports structural equivalence, despite weaker overall fit for this scale.

Suspicious (fL).

Table 23. Suspicious (fL): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	1,929.59	54	.78	.73	.09	.06
Male (n = 2,310)	911.20	108	.78	.73	.09	.06
Female (n = 1,666)	589.23	108	.78	.73	.09	.06
White (n = 2,389)	964.80	132	.76	.70	.09	.06
Non-White (n = 665)	227.40	132	.76	.70	.09	.06
English (n = 2,939)	1,206.32	108	.76	.71	.09	.06
Not English (n = 597)	214.71	108	.76	.71	.09	.06

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

Table 23 summarises the CFA results for Suspicious (fL), which indicate acceptable residual fit (SRMR) and RMSEA values across all demographic groups. CFI and TLI values were below conventional cut-offs but displayed minimal variation across groups. The consistent pattern of model fit across demographic groups provides evidence that the Suspicious scale exhibits structural equivalence across gender, ethnic, and language groups.

Abstract (fM).

Table 24. Abstract (fM): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	1,634.61	54	.65	.57	.09	.07
Male (n = 2,310)	975.35	108	.65	.58	.09	.06
Female (n = 1,666)	629.25	108	.65	.58	.09	.06
White (n = 2,389)	906.47	132	.67	.59	.08	.06
Non-White (n = 665)	266.30	132	.67	.59	.08	.06
English (n = 2,939)	1,113.18	108	.66	.58	.08	.06
Not English (n = 597)	254.36	108	.66	.58	.08	.06

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

The CFAs for Abstract (fM), shown in Table 24, demonstrated weaker overall model fit, with lower CFI and TLI values across all groups. However, RMSEA and SRMR values were within acceptable ranges, and the pattern of fit indices was consistent across demographic groups. This suggests that, although overall fit is limited, the same underlying factor structure is replicated across groups, supporting structural equivalence.

Restrained (fN).

Table 25. Restrained (fN): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	1,661.72	54	.78	.73	.09	.06
Male (n = 2,310)	602.63	108	.79	.74	.09	.06
Female (n = 1,666)	579.10	108	.79	.74	.09	.06
White (n = 2,389)	725.05	132	.80	.75	.08	.06
Non-White (n = 665)	180.86	132	.80	.75	.08	.06
English (n = 2,939)	88.90	108	.79	.74	.08	.06
Not English (n = 597)	182.80	108	.79	.74	.08	.06

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

As reported in Table 25, the Restrained (fN) CFAs yielded moderate model fit, with acceptable RMSEA and SRMR values and stable CFI and TLI values across groups. The close similarity of fit indices across gender, ethnic, and language groups indicates that the factor structure of the Restrained scale is consistently represented across groups, providing evidence of structural equivalence.

Self-Doubting (fO).

Table 26. Self-Doubting (fO): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	501.78	54	.95	.94	.05	.03
Male (n = 2,310)	272.63	108	.95	.94	.05	.03
Female (n = 1,666)	229.38	108	.95	.94	.05	.03
White (n = 2,389)	294.75	132	.96	.95	.04	.03
Non-White (n = 665)	89.40	132	.96	.95	.04	.03
English (n = 2,939)	341.45	108	.96	.95	.04	.03
Not English (n = 597)	99.47	108	.96	.95	.04	.03

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

The CFA results for Self-Doubting (fO) presented in Table 26 show good model fit, with CFI and TLI values above 0.90 and low RMSEA and SRMR values across all demographic groups. The consistency of fit indices across groups provides strong support for the replication of the intended factor structure and clear evidence of structural equivalence.

Radical (fQ1).

Table 27. Radical (fQ1): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	3288.06	54	.52	.41	.12	.10
Male (n = 2,310)	1815.08	108	.55	.45	.12	.09
Female (n = 1,666)	1322.31	108	.55	.45	.12	.09
White (n = 2,389)	2059.60	132	.55	.45	.12	.09
Non-White (n = 665)	356.24	132	.55	.45	.12	.09
English (n = 2,939)	2378.62	108	.53	.43	.12	.09
Not English (n = 597)	371.46	108	.53	.43	.12	.09

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

Table 27 presents the CFA results for Radical (fQ1), which indicate modest overall model fit, with both higher RMSEA and SRMR values as well as lower CFI and TLI values. These fit patterns were highly consistent across demographic groups, suggesting that the same factor structure is estimated across groups. Despite weaker global fit, the results support structural equivalence.

Self-Sufficient (fQ2).

Table 28. Self-Sufficient (fQ2): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	1,145.22	54	.85	.82	.07	.05
Male (n = 2,310)	645.37	108	.85	.82	.07	.05
Female (n = 1,666)	399.59	108	.85	.82	.07	.05
White (n = 2,389)	625.71	132	.87	.84	.07	.05
Non-White (n = 665)	187.41	132	.87	.84	.07	.05
English (n = 2,939)	719.31	108	.86	.83	.07	.05
Not English (n = 597)	179.36	108	.86	.83	.07	.05

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

As shown in Table 28, the CFAs for Self-Sufficient (fQ2) demonstrated modest model fit, with RMSEA and SRMR values close to recommended ranges and consistent CFI and TLI values across groups. The replication of fit patterns across demographic groups supports the conclusion that the intended factor structure is structurally equivalent across gender, ethnic, and language groups.

Self-Disciplined (fQ3).

Table 29. Self-Disciplined (fQ3): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	1,472.90	54	.78	.73	.08	.06
Male (n = 2,310)	634.11	108	.78	.73	.08	.05
Female (n = 1,666)	535.42	108	.78	.73	.08	.05
White (n = 2,389)	743.61	132	.75	.69	.08	.06
Non-White (n = 665)	182.85	132	.75	.69	.08	.06
English (n = 2,939)	902.12	108	.78	.73	.08	.05
Not English (n = 597)	182.31	108	.78	.73	.08	.05

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

The CFA results for Self-Disciplined (fQ3), reported in Table 29, indicate moderate model fit, with acceptable RMSEA and SRMR values and relatively stable CFI and TLI values across groups. The consistency of fit indices across demographic groups suggests that the factor structure of this scale is replicated across groups, providing evidence of structural equivalence.

Tense-Driven (fQ4).

Table 30. Tense-Driven (fQ4): CFA Model Fit across Demographic Groups

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 4,051)	816.47	54	.91	.89	.06	.04
Male (n = 2,310)	426.92	108	.92	.90	.06	.04
Female (n = 1,666)	313.42	108	.92	.90	.06	.04
White (n = 2,389)	492.70	132	.92	.90	.06	.04
Non-White (n = 665)	116.51	132	.92	.90	.06	.04
English (n = 2,939)	531.99	108	.92	.90	.06	.04
Not English (n = 597)	96.99	108	.92	.90	.06	.04

Note. χ^2 = Chi-square; df = degrees of freedom; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

Table 30 summarises the CFA results for Tense-Driven (fQ4), which show acceptable to good model fit, with CFI values above 0.90, acceptable RMSEA values, and good SRMR values across all demographic groups. The strong consistency of fit indices across gender, ethnic, and language groups provides clear evidence that the intended factor structure of the Tense-Driven scale is consistently replicated, supporting structural equivalence.

Overall, some variation in model fit indices across primary factors and demographic groups was consistent with the internal consistency patterns observed in Table 10. Scales with lower internal consistency coefficients (particularly those with lower α and ω values) are characterised by greater item-specific variance and lower shared covariance among items. Under such conditions, confirmatory models that impose a strict simple structure, where items load only on their intended latent factor and cross-loadings are constrained to zero, tend to fit less optimally, which may be reflected in comparatively lower CFI and TLI values. Importantly, this pattern does not indicate misspecification of the intended measurement model, but rather reflects the inherently heterogeneous and broadband nature of certain personality constructs, which are designed to capture diverse behavioural expressions rather than narrowly homogeneous item content.

Global Factors

Having established the structural replication of individual primary scales across demographic groups, CFAs were next conducted at the level of the five higher-order global factors to examine whether broader aggregations of traits, which are theoretically more heterogeneous in item content than the primary scales, maintain comparable structure across demographic groups. Given this complexity, scale-level CFAs for the global factors were not intended to meet the strict simple-structure criteria applied to primary scales. Rather, these analyses were conducted to assess the consistency of model fit patterns across demographic subgroups and to confirm structural equivalence of the higher-order dimensions in the UK sample. Given their higher-order nature, CFI and TLI values are expected to be lower than for the primary scales, with interpretation emphasising stability of fit indices across groups and acceptable absolute fit as indicated by RMSEA and SRMR.

Across all five global factors, as seen in Table 31, model fit indices showed highly consistent patterns across gender, ethnic, and language groups. Although incremental fit indices (CFI and TLI) were systematically lower than those observed for primary factors, RMSEA and SRMR values consistently fell within acceptable ranges, indicating adequate absolute and residual fit. This pattern is consistent with expectations for broad, higher-order personality dimensions composed of heterogeneous primary traits. The close similarity of fit indices across groups provides evidence that the global factor structures operate comparably across key demographic groups, supporting structural equivalence at the global factor level.

Taken together, the confirmatory factor analytic results for both the primary and global scales of the 15FQ+ provide converging evidence for the structural validity and cross-group robustness of the instrument in the UK context. At the primary scale level, CFA results consistently demonstrated acceptable to good model fit across the overall sample and across gender, ethnic, and language groups, with CFI and TLI values ranging from adequate to good across most scales, with some variation observed for constructs with broader or more heterogeneous item content, and RMSEA and SRMR values indicating good absolute and residual fit. These findings support the intended measurement model of the 15FQ+ at the level of its core personality dimensions and provide clear evidence of structural (functional) equivalence across key demographic groups. At the global factor level, CFA results showed systematically lower incremental fit indices, which is consistent with the theoretically broader and more heterogeneous nature of these higher-order constructs. Importantly, however, absolute fit indices and residual-based indices remained within acceptable ranges, and patterns of model fit were highly consistent across demographic groups. This convergence of results across both levels of the measurement model indicates that the primary and global factor structures of the 15FQ+ are stable and comparable across

groups, supporting its use for interpretation and comparison within the UK population. While the primary scales can be seen as core interpretive units of the 15FQ+, the global factors should be interpreted at a descriptive, integrative level.

Table 31. Global Factor CFA Model Fit across Demographic Groups

Global Factor	Sample	χ^2	CFI	TLI	RMSEA	SRMR
Extraversion	Overall (n = 4,051)	13729.94	.72	.70	.05	.06
	Male (n = 2,310)	7367.56	.72	.70	.05	.06
	Female (n = 1,666)	5399.10	.72	.70	.05	.06
	White (n = 2,389)	7036.77	.75	.74	.05	.06
	Non-White (n = 665)	261.00	.75	.74	.05	.06
	English (n = 2,939)	9082.23	.72	.71	.05	.06
	Not English (n = 597)	2645.20	.72	.71	.05	.06
Anxiety	Overall (n = 4,051)	8676.35	.83	.82	.04	.05
	Male (n = 2,310)	5179.85	.83	.82	.04	.05
	Female (n = 1,666)	3683.52	.83	.82	.04	.05
	White (n = 2,389)	5211.23	.83	.82	.04	.05
	Non-White (n = 665)	200.50	.83	.82	.04	.05
	English (n = 2,939)	5989.55	.83	.82	.04	.05
	Not English (n = 597)	1962.00	.83	.82	.04	.05
Pragmatism	Overall (n = 4,051)	1298.57	.60	.58	.05	.06
	Male (n = 2,310)	728.42	.59	.57	.05	.06
	Female (n = 1,666)	4696.44	.59	.57	.05	.06
	White (n = 2,389)	7575.61	.62	.60	.05	.06
	Non-White (n = 665)	2535.00	.62	.60	.05	.06
	English (n = 2,939)	9137.13	.61	.59	.05	.06
	Not English (n = 597)	2358.72	.61	.59	.05	.06
Independence	Overall (n = 4,051)	13487.49	.62	.60	.05	.07
	Male (n = 2,310)	7477.76	.62	.60	.05	.07
	Female (n = 1,666)	5422.27	.62	.60	.05	.07
	White (n = 2,389)	7115.84	.65	.63	.05	.06
	Non-White (n = 665)	2622.00	.65	.63	.05	.06
	English (n = 2,939)	917.81	.62	.60	.05	.07
	Not English (n = 597)	2552.80	.62	.60	.05	.07
Self-Control	Overall (n = 4,051)	6559.03	.76	.75	.05	.05
	Male (n = 2,310)	3109.00	.76	.75	.05	.05
	Female (n = 1,666)	2666.00	.76	.75	.05	.05
	White (n = 2,389)	3422.00	.76	.74	.05	.06
	Non-White (n = 665)	1223.00	.76	.74	.05	.06
	English (n = 2,939)	4149.00	.76	.75	.05	.05
	Not English (n = 597)	1129.97	.76	.75	.05	.05

Note. χ^2 = Chi-square; CFI = Comparative Fit Index; TLI = Tucker–Lewis Index; RMSEA = Root Mean Square Error of Approximation; SRMR = Standardised Root Mean Square Residual.

Inter-factor Correlations

Inter-factor associations among the primary 15FQ+ scales were examined using correlations between scale scores. These correlations are presented in Table 32. As expected for a multidimensional personality instrument, several statistically significant associations were observed, indicating some degree of covariation among primary traits. These findings are consistent with theoretical accounts of personality structure in which primary traits cluster under superordinate meta-traits or global dimensions (Digman, 1997; DeYoung, 2015), supporting the interpretation of the 15FQ+ as a hierarchically organised measure with differentiated but related primary factors.

Table 32. Inter-Factor Correlations of the 15FQ+ Primary Factors

	*f*A	ß	*f*C	*f*E	*f*F	*f*G	*f*H	*f*I	*f*L	*f*M	*f*N	*f*O	*f*Q1	*f*Q2	*f*Q3
***f*A**	—														
ß	.11*	—													
***f*C**	.15*	.30*	—												
***f*E**	-.01	.27*	.20*	—											
***f*F**	.38*	.20*	.26*	.17*	—										
***f*G**	.09*	.21*	.22*	.13*	-.00	—									
***f*H**	.28*	.35*	.42*	.45*	.53*	.08*	—								
***f*I**	.34*	.04*	-.03	-.11*	.11*	.00	.07*	—							
***f*L**	-.25*	-.19*	-.39*	.05*	-.24*	.01	-.19*	-.13*	—						
***f*M**	.17*	.18*	-.17*	.07*	.18*	-.17*	.18*	.26*	.02	—					
***f*N**	.27*	.11*	.28*	-.22*	.00	.28*	-.02	.12*	-.20*	-.16*	—				
***f*O**	.00	-.26*	-.60*	-.30*	-.21*	-.09*	-.46*	.11*	.19*	.11*	-.04*	—			
***f*Q1**	.03	.09*	-.08*	.16*	.13*	-.27*	.17*	.14*	.04*	.42*	-.31*	-.05*	—		
***f*Q2**	-.32*	-.08*	-.30*	-.14*	-.53*	-.01	-.40*	-.07*	.37*	.00	-.11*	.17*	.03	—	
***f*Q3**	-.01	-.01	.04*	.12*	-.05*	.34*	.03*	-.19*	.24*	-.17*	.19*	-.03*	-.38*	.02	—
***f*Q4**	-.23*	-.27*	-.57*	.05*	-.19*	-.18*	-.24*	-.06*	.34*	.08*	-.43*	.41*	.11*	.23*	-.06*

Note. * Statistically significant at the .05 level

Overall, the magnitude of the correlations was weak to moderate, with the large majority of coefficients falling below |r| = .35, and none approaching levels typically considered indicative of problematic construct overlap. This pattern provides evidence for the discriminant validity of the primary 15FQ+ factors, suggesting that the scales assess related but distinct aspects of personality functioning.

Where comparatively stronger associations were observed, these were theoretically interpretable and aligned with the hierarchical structure of the 15FQ+. For example, Emotionally Stable (ƒC) showed moderate negative associations with Self-doubting (ƒO) and Tense-driven (ƒQ4), consistent with their shared alignment with the anxiety global factor. Similarly, Enthusiastic (ƒF), Socially-bold (ƒH), and Self-sufficient (ƒQ2) demonstrated moderate intercorrelations, reflecting their common contribution to the higher-order Extraversion global factor.

Item Fit Indices – Rasch analysis

Building on the factor analysis results, which supported the intended factor structure and demonstrated structural equivalence across demographic groups at the scale level, the 15FQ+ primary scales were analysed using Rasch measurement models, which evaluate the extent to which individual item responses correspond to the expected pattern of the underlying personality trait (Bond & Fox, 2015).

For each item, the model estimates an Item Location, reflecting the relative difficulty or intensity of the trait assessed, along with a Standard Error (S.E.), indicating the precision of this estimate. Item fit was assessed using Infit and Outfit, where Infit values are more sensitive to unexpected response patterns from persons with trait levels near the item's difficulty, while Outfit values are particularly sensitive to outlying responses. Values close to 1 indicate good fit, with values below 0.70 or above 1.35 suggesting potential misfit. Misfit may arise due to underfit (Infit/Outfit > 1.35), where the item does not measure the intended construct reliably, or overfit (Infit/Outfit < 0.70), where the item adds little unique information beyond what other items provide (Linacre, 2019; Linacre & Wright, 1994). Outfit statistics are particularly sensitive to outlying responses and, while reported, are generally considered less critical for interpretive decisions than Infit values (Bond & Fox, 2015).

Item fit indices for Empathic (fA)

Table 33. Empathic (fA) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fA1	-0.18	0.09	0.96	**0.64**
fA2	1.69	0.04	1.28	**1.47**
fA3	-0.98	0.04	1.01	1.00
fA4	-1.73	0.12	1.05	0.95
fA5	0.50	0.07	0.99	1.05
fA6	0.27	0.05	0.94	0.87
fA7	-2.79	0.08	0.98	0.91
fA8	-0.12	0.07	0.87	**0.55**
fA9	1.65	0.04	1.09	1.15
fA10	-0.39	0.12	1.01	0.80
fA11	-0.36	0.06	0.88	**0.66**
fA12	0.64	0.05	1.10	1.23

Item fit indices for Intellectance (ß)

Table 34. Intellectance (ß) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
ß1	-0.46	0.06	1.02	1.02
ß2	-0.08	0.05	1.09	1.21
ß3	1.33	0.04	1.09	1.12
ß4	-0.09	0.04	0.99	0.99
ß5	0.80	0.05	0.99	0.94
ß6	0.37	0.05	1.13	1.34
ß7	0.12	0.06	0.96	0.76
ß8	-0.41	0.07	1.02	1.26
ß9	-0.43	0.07	0.98	0.85
ß10	-0.13	0.04	0.97	0.92
ß11	1.01	0.05	1.01	0.90
ß12	-0.33	0.08	0.95	0.84

Item fit indices for Emotionally Stable (fC)

Table 35. Emotionally Stable (fC) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fC1	1.92	0.04	0.93	0.81
fC2	-0.08	0.06	1.04	1.02
fC3	-1.27	0.04	1.01	0.99
fC4	-0.03	0.05	1.18	**1.92**
fC5	-2.54	0.08	0.95	0.75
fC6	-1.56	0.05	0.93	0.87
fC7	2.38	0.04	1.01	1.05
fC8	1.06	0.05	0.93	0.89
fC9	-2.18	0.06	0.97	0.92
fC10	-2.33	0.07	1.00	1.10
fC11	1.47	0.04	1.05	1.05
fC12	1.75	0.04	0.94	0.94

Item fit indices for Dominant (fE)

Table 36. Dominant (fE) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fE1	0.68	0.04	1.01	1.02
fE2	0.51	0.04	0.99	1.01
fE3	0.12	0.04	1.00	1.01
fE4	0.59	0.04	1.02	1.08
fE5	2.72	0.04	1.05	1.14
fE6	0.91	0.03	1.03	1.03
fE7	0.25	0.04	0.98	1.00
fE8	-1.50	0.05	1.00	1.02
fE9	0.56	0.04	0.92	0.89
fE10	0.27	0.04	1.00	1.05
fE11	1.41	0.03	1.04	1.04
fE12	-1.64	0.05	0.97	0.90

Item fit indices for Enthusiastic (fF)

Table 37. Enthusiastic (fF) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fF1	0.02	0.05	0.95	0.85
fF2	2.09	0.04	0.97	0.94
fF3	1.31	0.04	1.02	1.02
fF4	1.38	0.04	1.07	1.10
fF5	1.53	0.04	1.04	1.08
fF6	1.47	0.04	0.95	0.92
fF7	1.44	0.04	1.08	1.05
fF8	2.19	0.04	1.17	**1.37**
fF9	0.41	0.04	0.95	0.90
fF10	0.59	0.04	0.96	0.89
fF11	0.06	0.05	1.01	1.05
fF12	1.43	0.04	0.90	0.83

Item fit indices for Conscientious (fG)

Table 38. Conscientious (fG) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fG1	0.87	0.05	0.92	0.77
fG2	1.39	0.05	0.98	0.98
fG3	0.44	0.05	0.97	0.96
fG4	0.88	0.04	1.15	1.28
fG5	0.96	0.05	1.03	1.15
fG6	1.27	0.04	1.08	1.11
fG7	0.11	0.05	0.86	**0.69**
fG8	0.11	0.06	1.09	1.30
fG9	0.50	0.05	0.99	1.04
fG10	0.50	0.05	1.07	1.14
fG11	0.27	0.07	1.02	1.14
fG12	0.81	0.05	0.87	0.78

Item fit indices for Socially-bold (fH)

Table 39. Socially-bold (fH) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fH1	2.42	0.04	0.88	0.81
fH2	0.97	0.04	0.96	0.89
fH3	1.49	0.04	1.07	1.12
fH4	0.74	0.05	0.93	0.79
fH5	-0.02	0.05	0.96	0.77
fH6	2.27	0.04	1.05	1.08
fH7	2.01	0.04	0.98	0.98
fH8	0.31	0.05	0.99	0.97
fH9	2.01	0.04	1.23	1.31
fH10	1.46	0.04	0.92	0.84
fH11	-0.11	0.04	0.99	1.00
fH12	0.32	0.04	1.07	1.27

Item fit indices for Tender-minded (fl)

Table 40. Tender-minded (fl) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fl1	1.77	0.04	1.00	1.02
fl2	1.53	0.04	1.06	1.10
fl3	2.45	0.04	1.02	1.01
fl4	1.99	0.04	0.98	0.97
fl5	2.18	0.04	1.01	1.01
fl6	1.54	0.04	1.02	1.05
fl7	2.44	0.04	1.04	1.07
fl8	1.49	0.04	0.92	0.90
fl9	2.15	0.04	1.02	1.06
fl10	1.67	0.04	1.00	1.00
fl11	-0.26	0.06	1.00	1.01
fl12	0.34	0.07	1.00	1.07

Item fit indices for Suspicious (fL)

Table 41. Suspicious (fL) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fL1	2.24	0.04	1.06	1.09
fL2	2.50	0.04	0.98	0.97
fL3	2.87	0.05	0.95	0.81
fL4	2.94	0.04	0.89	0.79
fL5	2.88	0.04	1.08	1.14
fL6	2.66	0.05	1.04	1.08
fL7	2.47	0.04	1.05	1.07
fL8	2.34	0.04	0.97	0.90
fL9	2.11	0.04	1.01	0.99
fL10	1.58	0.04	1.06	1.13
fL11	2.25	0.04	0.90	0.84
fL12	5.56	0.12	1.02	0.80

Item fit indices for Abstract (fM)

Table 42. Abstract (fM) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fM1	2.58	0.03	1.06	1.08
fM2	2.56	0.04	0.99	1.00
fM3	0.80	0.04	0.97	0.97
fM4	2.33	0.04	0.99	1.00
fM5	0.89	0.04	1.00	1.05
fM6	1.45	0.04	1.01	1.02
fM7	2.76	0.04	0.94	0.91
fM8	3.28	0.06	0.96	0.93
fM9	1.55	0.03	1.06	1.07
fM10	3.20	0.05	0.93	0.85
fM11	-1.95	0.05	1.01	1.01
fM12	1.30	0.03	1.02	1.04

Item fit indices for Restrained (fN)

Table 43. Restrained (fN) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fN1	1.18	0.04	1.09	1.20
fN2	0.90	0.07	0.95	0.82
fN3	1.39	0.04	1.03	1.04
fN4	1.67	0.04	1.01	1.01
fN5	0.17	0.07	0.99	0.95
fN6	0.17	0.05	1.04	1.11
fN7	0.24	0.06	0.89	0.79
fN8	0.69	0.04	0.99	1.00
fN9	0.70	0.05	0.95	0.90
fN10	0.80	0.06	0.88	0.71
fN11	0.22	0.05	1.05	1.29
fN12	0.42	0.06	1.01	1.06

Item fit indices for Self-doubting (fO)

Table 44. Self-doubting (fO) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fO1	1.61	0.04	1.14	1.26
fO2	1.29	0.04	1.11	1.15
fO3	1.47	0.04	0.92	0.85
fO4	1.90	0.04	0.96	0.93
fO5	1.98	0.04	0.97	0.94
fO6	1.41	0.04	1.09	1.14
fO7	1.97	0.04	0.98	0.97
fO8	2.83	0.04	0.97	0.91
fO9	1.70	0.04	0.90	0.84
fO10	1.39	0.04	1.07	1.12
fO11	2.43	0.04	1.01	1.00
fO12	0.87	0.04	0.99	0.98

Item fit indices for Radical (fQ1)

Table 45. Radical (fQ1) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fQ_1 1	1.48	0.04	1.04	1.09
fQ_1 2	1.49	0.04	1.06	1.09
fQ_1 3	1.39	0.04	1.00	1.03
fQ_1 4	1.89	0.04	0.99	1.00
fQ_1 5	1.35	0.03	1.00	1.01
fQ_1 6	2.00	0.04	0.93	0.92
fQ_1 7	0.79	0.04	1.02	1.06
fQ_1 8	2.79	0.04	1.00	0.99
fQ_1 9	2.43	0.04	0.98	0.99
fQ_1 10	1.76	0.04	0.96	0.93
fQ_1 11	2.15	0.04	0.99	0.98
fQ_1 12	2.03	0.04	0.91	0.87

Item fit indices for Self-sufficient (fQ2)

Table 46. Self-sufficient (fQ2) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fQ_2 1	1.81	0.05	1.09	**1.66**
fQ_2 2	2.60	0.04	1.11	1.19
fQ_2 3	1.67	0.04	0.95	0.92
fQ_2 4	3.04	0.04	0.94	0.88
fQ_2 5	3.53	0.05	1.11	1.28
fQ_2 6	1.73	0.04	0.90	0.86
fQ_2 7	2.62	0.04	1.03	1.08
fQ_2 8	1.99	0.04	0.88	0.84
fQ_2 9	2.72	0.05	0.97	0.93
fQ_2 10	2.36	0.04	1.13	1.20
fQ_2 11	2.68	0.04	0.93	0.88
fQ_2 12	1.67	0.04	0.92	0.89

Item fit indices for Self-disciplined (fQ3)

Table 47. Self-disciplined (fQ3) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fQ_3 1	0.55	0.04	1.00	0.98
fQ_3 2	-0.07	0.05	0.97	0.95
fQ_3 3	0.40	0.04	1.15	1.34
fQ_3 4	0.06	0.05	0.93	0.82
fQ_3 5	0.29	0.05	1.18	**1.61**
fQ_3 6	-0.31	0.06	0.90	0.70
fQ_3 7	-0.48	0.06	1.08	1.34
fQ_3 8	2.00	0.04	1.05	1.05
fQ_3 9	-0.65	0.09	0.94	0.75
fQ_3 10	-0.16	0.04	0.99	0.94
fQ_3 11	0.04	0.05	1.01	1.09
fQ_3 12	0.24	0.04	1.01	1.04

Item fit indices for Tense-driven (fQ4)

Table 48. Tense-driven (fQ4) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fQ_4 1	3.34	0.04	0.94	0.87
fQ_4 2	1.82	0.04	1.02	1.03
fQ_4 3	1.93	0.04	0.92	0.88
fQ_4 4	3.18	0.05	0.83	**0.68**
fQ_4 5	2.56	0.04	1.05	1.12
fQ_4 6	1.72	0.04	1.14	1.28
fQ_4 7	3.02	0.04	1.07	1.09
fQ_4 8	2.41	0.04	1.04	1.04
fQ_4 9	2.93	0.04	1.00	0.97
fQ_4 10	3.03	0.04	0.96	0.94
fQ_4 11	2.99	0.04	0.95	0.89
fQ_4 12	1.03	0.04	1.03	1.11

Overall, the Rasch analysis of the 15FQ+ primary scales, presented in Tables 33 to 48 indicated that items generally fit the model well. Across all scales, Infit statistics were within acceptable limits, suggesting that item responses are consistent with expectations for respondents whose trait levels are near the item's difficulty. A small number of Outfit statistics fell slightly outside the stricter cut-offs (.70–1.35) and were indicated as such in the tables in bold, but these deviations were minor and do not indicate meaningful misfit. Therefore, the items demonstrate adequate fit to the Rasch model, supporting the unidimensionality assumptions of each scale.

Differential Item Functioning

Following the Rasch analysis, Differential Item Functioning (DIF) was examined to determine whether items functioned equivalently across demographic subgroups. DIF analyses assess whether differences in item responses are attributable to group membership rather than the underlying trait, which is important for establishing the fairness and comparability of the scales (Zumbo, 1999; Zwick & Thayer, 1996).

For the 15FQ+ primary scales, DIF was evaluated using a rank-based approach, comparing item responses across gender, ethnicity, and language. Spearman rho correlations between respondents were calculated for each scale, along with median rank differences. Spearman's rho was used to evaluate the correspondence of item difficulty rank orders between groups, with values of ρ ≥ .90 indicating excellent agreement and minimal concern for DIF, values between .80 and .89 reflecting moderate agreement and possible DIF, and values below .80 suggesting weak agreement and a stronger potential for DIF (Prion & Haerling, 2014). Median rank differences were used to capture the typical (central) item shift, with values between 0.00 and 0.50 indicating excellent invariance and near-identical item ordering, values between 0.50 and 1.00 reflecting good invariance with items differing by no more than one rank on average, values between 1.00 and 1.50 suggesting mild DIF, and values of 1.50 or higher indicating moderate concern due to weaker consistency in item ordering across groups (Osterlind & Everson, 2009; Salkind, 2007).

DIF across gender groups

Overall, the pattern of results presented in Table 49 indicates strong invariance of item functioning across gender groups for the majority of the 15FQ+ primary scales. The majority of scales demonstrate strong agreement in item difficulty rank ordering, with Spearman correlations at or above .90 and median rank differences of 1.00 or lower, indicating good to excellent invariance.

Factors *f*F (ρ = .87) and *f*O (ρ = .89) fall within the moderate agreement range, although their median rank differences (≤ 1.50) suggest that typical item shifts remain relatively small. More notable departures from strong invariance are observed for *f*I (ρ = .79; median rank difference = 2.00) and *f*Q3 (ρ = .78; median rank difference = 2.00), which fall below the .80 threshold and indicate weaker correspondence in item ordering across gender groups, however, as indicated earlier, females tend to score higher on these scales than males, which may support interpretation.

Table 49. DIF Analysis by Gender across primary scales

Scale	Spearman ρ	Median rank difference
*f*A	0.96	0.00
ß	0.90	1.00
*f*C	0.95	1.00
*f*E	0.93	0.50
*f*F	0.87	0.50
*f*G	0.90	1.00
*f*H	0.96	0.50
*f*I	0.79	2.00
*f*L	0.92	1.00
*f*M	0.96	0.50
*f*N	0.96	1.00
*f*O	0.89	1.50
*f*Q1	0.85	1.50
*f*Q2	0.97	0.00
*f*Q3	0.78	2.00
*f*Q4	0.97	0.00

Overall, the pattern across scales indicates that gender-based DIF is limited in scope and largely confined to a small number of factors. For most primary scales, item ordering remains stable across male and female respondents, supporting broad comparability of scale scores across gender in the UK sample.

DIF across ethnic groups

The DIF results across ethnic groups in Table 50 indicate greater variability in item functioning compared to gender analyses. Several scales demonstrate strong agreement in item ordering (e.g., *f*I, *f*N), with Spearman correlations at or above .90 and median rank differences of 1.00 or lower, suggesting good invariance.

However, a few scales show weaker agreement, with ρ-values below .80, indicating reduced correspondence in item rank ordering across ethnic groups. Median rank differences for some of these scales (e.g., *f*F = 3.00; *f*E and *f*G = 2.50; fQ3 = 2.50) suggest moderate item-level shifts. These findings indicate the presence of potential DIF on these primary scales, however, this information should be considered alongside the internal consistencies, t-tests, and factor analyses results reported earlier. Although not uniform across all factors, the broader pattern suggests that ethnic group comparisons display more item-level variation

than gender comparisons. These differences appear to reflect relative changes in item difficulty ordering rather than uniform directional bias.

Table 50. DIF Analysis by Ethnicity across primary scales

Scale	Spearman ρ	Median rank difference
*f*A	0.87	1.00
ß	0.57	2.00
*f*C	0.85	1.00
*f*E	0.62	2.50
*f*F	0.39	3.00
*f*G	0.64	2.50
*f*H	0.78	1.50
*f*I	0.93	1.00
*f*L	0.79	1.50
*f*M	0.89	1.00
*f*N	0.90	1.00
*f*O	0.76	2.00
*f*Q1	0.62	1.50
*f*Q2	0.83	2.00
*f*Q3	0.48	2.50
*f*Q4	0.69	1.00

DIF across language groups

The DIF results across language groups reported in Table 51 indicate generally good measurement equivalence, although with some variability across scales. Several factors demonstrate strong agreement in item ordering (ρ ≥ .90) and median rank differences of 1.00 or lower, supporting good invariance. Some scales show moderate agreement, including ß (ρ = .83), fF (ρ = .80), fO (ρ = .84), and fQ2 (ρ = .88), with median rank differences ranging from 0.00 to 2.00. These results suggest minor item-level variation but generally acceptable stability in rank ordering. Only one scale, fQ3 (ρ = .61; median rank difference = 3.00), shows weaker agreement and larger typical rank shifts, indicating potential moderate DIF across language groups for this factor.

Taken together, the language-based DIF analyses suggest that most primary scales function similarly across English and non-English first-language respondents in the UK sample, with isolated evidence of potential item-level variation on specific factors.

Table 51. DIF Analysis by Language across primary scales

Scale	Spearman ρ	Median rank difference
*f*A	0.96	1.00
ß	0.83	1.50
*f*C	0.91	1.00
*f*E	0.71	1.00
*f*F	0.80	0.00
*f*G	0.93	0.75
*f*H	0.96	0.50
*f*I	0.97	0.00
*f*L	0.92	1.00
*f*M	0.94	1.00
*f*N	0.92	1.00
*f*O	0.84	2.00
*f*Q1	0.77	1.00
*f*Q2	0.88	1.50
*f*Q3	0.61	3.00
*f*Q4	0.92	1.00

Across all three demographic comparisons, the majority of scales demonstrate excellent to good invariance, with high correlations in item difficulty ordering and small typical rank shifts. Any observed deviations are limited in scope, do not converge on the same scales across demographic groups (except for *f*Q3), and are unlikely to meaningfully affect score interpretation or decision-making, thereby supporting the use of the 15FQ+ in diverse assessment contexts.

Viewed collectively, the CFA, Rasch, and DIF findings align (Gomez-Benito et al., 2018), and support the conclusion that the 15FQ+ measures the same underlying personality constructs in the same way across relevant demographic group. Accordingly, the instrument can be considered both psychometrically sound and equitable for use in applied assessment contexts, with confidence in the interpretability and comparability of scores across diverse populations.

Convergent Validity

Having established measurement equivalence across demographic groups in the preceding section, the focus now shifts to convergent and discriminant validity, which is the extent to which the 15FQ+ scales relate to theoretically aligned personality constructs assessed by other measures.

Relationships between the 15FQ+ and a wide range of personality and individual difference instruments have been examined, including the 16PF (4th and 5th editions), Abstract Reasoning Test (ART), Approaches to Learning Questionnaire, Critical Reasoning Test Battery (CRTB2), Eysenck Personality Questionnaire–Revised (EPQ-R), General Reasoning Test (1 and 2), Jung Type Indicator (JTI), Myers–Briggs Type Indicator (MBTI), NEO Personality Inventory–Revised (NEO PI-R), Occupational Personality Questionnaire (OPQ32i), Professional Personality Questionnaire (PPQ), Personality and Values Questionnaire (PVQ), Occupational Interest Profile Plus (OIP+), Occupational Personality Profile (OPPro), the Values and Motives Inventory (VMI), and the Work Habits and Attitudes Questionnaire (WHAQ). These studies further contribute to evaluating the extent to which the 15FQ+ demonstrates theoretically coherent convergence with related constructs, while maintaining appropriate construct distinctiveness within multi-instrument assessment batteries.

Relationships between the 15FQ+ and Approaches to Learning Questionnaire

As part of a study investigating the relationship between personality and learning style, 144 undergraduate students (109 female, 35 male) at a UK university completed the 15FQ+ and the revised Approaches to Learning Questionnaire (Duff, 1997). Table 52 presents correlations between the 15FQ+ global factors and the three learning approaches assessed, along with academic success.

Table 52. Correlations between the 15FQ+ global factors and approaches to learning and academic success

	Deep Approach	Surface Approach	Strategic Approach	Academic Success
Extraversion	.214*	- .084	.384*	.030
Neuroticism	-.178*	.442*	-.241*	-.140
Openness	.341*	-.033	.179*	.063
Agreeableness	-.175*	.209*	-.072	.092
Conscientiousness	.191*	-.025	.422*	.142

Deep learning, characterised by a desire to understand and engage critically with material, is positively associated with Openness and Extraversion, and negatively associated with Anxiety, consistent with the role of intellectual curiosity, engagement, and emotional stability in depth of processing. Surface learning, associated with rote memorisation and avoidance of failure, shows its strongest positive correlation with Anxiety, reflecting the role of worry and self-doubt in superficial, defensive approaches to study. Strategic learning, oriented toward achieving high grades through organised effort, is most strongly associated with self-Control and Extraversion, and negatively with Anxiety, consistent with the role of conscientiousness, drive, and emotional resilience in goal-directed study behaviour. Academic success shows modest associations with self-Control (positive) and Anxiety (negative), consistent with established findings linking conscientiousness and emotional stability to academic performance.

Relationships between the 15FQ+ and EPQ-R

A sample of 112 undergraduates completed both the 15FQ+ and the Eysenck Personality Questionnaire–Revised (EPQ-R) as part of a test validation exercise. The EPQ-R assesses Extraversion, Neuroticism, Psychoticism, and includes a Lie Scale measuring social desirability, as well as Impulsivity, Venturesomeness, and Empathy-Sensitivity subscales. Table 53 presents correlations between the 15FQ+ primary factors and the EPQ-R scales, with correlations below .30 omitted for clarity.

Table 53. Correlations between the 15FQ+ primary factors and the EPQ-R scales

	Extraversion	Neuroticism	Psychoticism	Lie Scale (Social-Desirability)	Impulsivity	Venture-someness	Empathy-Sensitivity
A		-.31					.58
ß		-.35				.40	
C		-.58					
E	.34		.40			.38	-.33
F	.71				.31	.34	
G				.31			
H	.58	-.31					
I						-.24	
L		.30					-.36
M							
N	-.31				-.41		
O		.68					.36
Q1							
Q2	-.69						
Q3			-.31	.41			
Q4		.48					
SD				.56			

The EPQ-R Extraversion scale shows strong positive correlations with *f*F (Enthusiastic) and *f*H (Socially-bold) and a strong negative correlation with *f*Q2 (Self-sufficient), consistent with these primaries' loading on the 15FQ+ Extraversion global factor. EPQ-R Neuroticism correlates strongly with *f*C (Emotionally Stable; negative), *f*O (Self-doubting), and *f*Q4 (Tense-driven), all of which contribute to the Anxiety global factor, providing clear convergent validity evidence for this cluster of primary scales. The strong correlation between EPQ-R Empathy-Sensitivity and *f*A (Empathic) provides further direct convergent evidence for this primary factor.

EPQ-R Psychoticism does not show substantial correlations with most 15FQ+ primaries, supporting the discriminant validity of the instrument. Minor associations with *f*E (Dominant) and *f*Q3 (Self-disciplined, negative) are theoretically interpretable — individuals scoring higher on psychoticism tend toward greater dominance and lower behavioural self-regulation. The strong correlation between the 15FQ+ Social Desirability scale and the EPQ-R Lie Scale provides direct convergent evidence for this impression management indicator. The additional correlation between the Lie Scale and *f*Q3 (Self-disciplined) is consistent with the observation that adherence to a strong moral code is associated with reluctance to endorse minor social transgressions of the kind assessed by the Lie Scale. Modest but statistically significant correlations between Venturesomeness and ß (Intellectance), and between Neuroticism and ß (negative), are consistent with the interpretation that intellectual self-confidence forms part of a broader self-confidence disposition.

Relationships between the 15FQ+ and Jung Type Indicator

894 respondents completed both the 15FQ+ and JTI on the GeneSys platform between January 2020 and June 2024, and all data was used to evaluate the relationships between the two personality assessments. In line with theoretical expectations, the strongest associations in Table 54 are observed between conceptually aligned constructs, while correlations with non-corresponding dimensions are generally small.

Extraversion–Introversion (EI).

Enthusiastic (*f*F) and Socially-bold (*f*H) show strong negative correlations with EI (r = −.73 and r = −.75 respectively), indicating that higher scores on these scales are associated with greater extraversion. Dominant (*f*E) also demonstrates a moderate negative relationship with EI (r = −.39), consistent with its interpersonal assertiveness content. Conversely, Self-sufficient (*f*Q2) correlates positively with EI (r = .64), reflecting a preference for autonomy and independence that aligns with introverted orientations.

Sensing–iNtuition (SN).

Abstract (ƒM) shows a substantial positive correlation with SN (r = .69), while Tender-minded (ƒI) is moderately related to this dimension (r = .42). Radical (ƒQ1) also demonstrates a meaningful association (r = .39), consistent with openness to new ideas and non-traditional perspectives.

Thinking–Feeling (TF).

Empathic (ƒA) correlates highly with TF (r = .59), reflecting shared emphasis on emotional awareness, sensitivity, and concern for others. Tender-minded (ƒI) also shows a substantial relationship with TF (r = .42), further reinforcing this interpretation.

Judging–Perceiving (JP).

A very strong correlation is observed between Conscientious (ƒG) and JP (r = −.81), indicating that higher conscientiousness is associated with a judging orientation characterised by structure, planning, and order. Self-disciplined (ƒQ3) also correlates meaningfully with JP (r = −.31), consistent with behavioural regulation and adherence to standards.

Table 54. Observed Correlation Estimates - 15FQ+ and JTI

	EI	JP	SN	TF
***f*A**	-.30*	-.12*	.21*	.59*
ß	-.16*	-.31*	.20*	-.10*
***f*C**	-.25*	-.36*	-.09*	-.15*
***f*E**	-.39*	-.18*	.02	-.24*
***f*F**	-.73*	.12*	.11*	.16*
***f*G**	.05*	-.81*	-.14*	-.07*
***f*H**	-.75*	-.09*	.16*	-.02
***f*I**	.03*	-.03	.42*	.42*
***f*L**	.15*	.09*	-.13*	-.20*
***f*M**	-.09*	.31*	.69*	.21*
***f*N**	.11*	-.32*	-.06*	.16*
***f*O**	.29*	.16*	.06*	.27*
***f*Q1**	-.12*	.33*	.39*	-.01
***f*Q2**	.64*	-.01	.05*	-.11*
***f*Q3**	-.02	-.31*	-.25*	-.02
***f*Q4**	.09*	.23*	-.01	-.01

Note. * Statistically significant at the .05 level. Correlations above 0.30 are highlighted in grey.

Discriminant validity.

Equally important, most 15FQ+ primaries show weak or negligible correlations with JTI dimensions to which they are not theoretically related. For example, Dominant (ƒE) and Socially-bold (ƒH) show minimal associations with SN and TF, while Conscientious (ƒG) displays little relationship with EI and TF. This pattern of selective, theoretically coherent associations supports the discriminant validity of the 15FQ+ scales and suggests that they are not unduly redundant with the JTI dimensions. Overall, the correlations demonstrate a clear pattern of convergence where conceptual overlap is expected, alongside low cross-domain correlations elsewhere.

Relationships between the 15FQ+ and the MBTI

A sample of 46 course delegates completed both the 15FQ+ and the Myers-Briggs Type Indicator (MBTI). The MBTI assesses four bipolar personality dimensions: Extraversion–Introversion (EI), Sensing–iNtuition (SN), Thinking–Feeling (TF), and Judging–Perceiving (JP). Table 55 presents correlations between the 15FQ+ primary factors and the MBTI scales, with correlations below .30 omitted for clarity.

Table 55. Correlations between significant 15FQ+ factors and MBTI scales

15FQ+ factor	Significant MBTI scale
ß	T (.34), F (-.34)
F	E (.66), I (-.86)
G	J (.52), P (-.69)
H	E (.46), I (-.72)
I	F (.39)
M	N (.57)
Q2	E (-.33), I (.60)

The pattern of correlations provides good support for the convergent and discriminant validity of the 15FQ+ primary factors. The Extraversion primaries *f*F (Enthusiastic) and *f*H (Socially-bold) show strong correlations with MBTI Extraversion and corresponding negative correlations with Introversion, while *f*Q2 (Self-sufficient) shows the reverse pattern, consistent with its emphasis on independence and preference for solitary working. Notably, none of these primaries correlate meaningfully with the SN, TF, or JP dimensions, demonstrating good discriminant validity within the Extraversion domain.

ß (Intellectance) shows modest correlations with the Thinking and Feeling scales, reflecting the association between intellectual self-confidence and an analytical, rational orientation. *f*I (Tender-minded) correlates with the Feeling scale, consistent with its emphasis on emotional sensitivity and aesthetic openness. *f*M (Abstract) correlates with Intuition, reflecting a

preference for abstract, theoretical perspectives over concrete detail. *f*G (Conscientious) shows a strong positive correlation with Judging and a corresponding negative correlation with Perceiving, consistent with its emphasis on structure, planning, and order. The failure of *f*G to correlate with any other MBTI dimension provides further support for its discriminant validity.

Relationships between the 15FQ+ and the NEO Personality Inventory

A sample of 60 undergraduates completed both the 15FQ+ and the NEO Personality Inventory–Revised (NEO PI-R). Table 56 presents the most significant correlations between the NEO PI-R facets and the 15FQ+ primary factors, with all reported correlations significant at the 1% level or below. Table 57 presents correlations between the 15FQ+ global factors and the NEO PI-R Big Five dimensions, and equivalent global factor correlations based on a separate sample of 37 MBA students who completed the NEO Five Factor Inventory (NEO FFI).

Table 56. Significant correlations between the 15FQ+ primary factors and the NEO PI-R facets

15FQ+ factor	NEO facet
A	Warmth .46, Tender-minded .45, Angry hostility -.38
ß	Competence .52, Assertiveness .50, Modesty -.41
C	Anxiety -.69, Depression -.69, Vulnerability -.60
E	Assertiveness .69, Modesty -.60, Compliance -.55
F	Gregariousness .63, Positive emotion .45, Excitement seeking .41
G	Order .75, Fantasy -.46, Achievement .44
H	Self-consciousness -.57, Modesty -.50, Activity .46
I	Aesthetics .44, Warmth .30
L	Trust -.74, Angry hostility .40, Vulnerability .33
M	Fantasy .67, Ideas .39, Impulsiveness .38
N	Compliance .46, Angry hostility -.45, Deliberation .40
O	Self-consciousness .62, Anxiety .57, Vulnerability .48
Q1	Actions .46, Values .46, Ideas .44
Q2	Gregariousness -.67, Warmth -.43, Dutifulness .36
Q3	Feelings -.54, Values -.51, Fantasy -.41
Q4	Angry hostility .80, Compliance -.67, Impulsiveness .45

Table 57. Correlations between the 15FQ+ global factors and the NEO PI-R and FFI

15FQ+ Global Factor	NEO PI-R (n = 60)	NEO FFI (n = 37)
Extraversion	.74	.66
Anxiety	.77	.57
Openness	.66	.55
Agreeableness	.61	.59
self-Control	.67	.69

The pattern of correlations in Table 56 provides strong support for the convergent validity of the 15FQ+ primary factors. Across all five global factors reported in Table 57, the strongest associations are observed between conceptually aligned constructs, while cross-domain correlations are generally small, supporting discriminant validity.

Among the Extraversion primaries, *f*F (Enthusiastic) shows its strongest association with NEO Gregariousness, consistent with its emphasis on lively social engagement, while *f*H (Socially-bold) correlates negatively with Self-consciousness and Modesty, reflecting social confidence and low social anxiety. *f*Q2 (Self-sufficient) shows substantial negative correlations with Gregariousness and Warmth, consistent with its emphasis on autonomy and preference for independent working. *f*A (Empathic) correlates most strongly with Warmth and Tender-minded, with a modest negative association with Angry hostility, reflecting its interpersonal warmth content.

Within the Anxiety global factor, *f*C (Emotionally Stable) shows strong negative correlations with Anxiety, Depression, and Vulnerability, consistent with emotional resilience and stability. *f*O (Self-doubting) correlates strongly with Self-consciousness, Anxiety, and Vulnerability, reflecting its apprehensive, self-questioning content. *f*Q4 (Tense-driven) shows its strongest association with Angry hostility, consistent with its emphasis on frustration intolerance and impatience.

Among the Openness primaries, *f*I (Tender-minded) correlates with Aesthetics and Warmth, reflecting openness to emotional and artistic experience. *f*M (Abstract) shows its strongest associations with Fantasy and Ideas, consistent with imaginative, conceptually oriented thinking. *f*Q1 (Radical) correlates meaningfully with Actions, Values, and Ideas, reflecting openness to innovation and non-conventional thinking.

For the Self-Control primaries, *f*G (Conscientious) shows a strong association with Order and a negative correlation with Fantasy, consistent with structured, detail-oriented behaviour. *f*N (Restrained) correlates with Compliance and Deliberation, reflecting diplomatic restraint,

while *f*Q3 (Self-disciplined) shows negative correlations with Feelings, Values, and Fantasy, consistent with behavioural self-regulation.

Within the Agreeableness global factor, *f*E (Dominant) correlates positively with Assertiveness and negatively with Modesty and Compliance, consistent with interpersonal dominance. *f*L (Suspicious) shows a strong negative correlation with Trust, providing particularly clear convergent validity evidence for this primary. ß (Intellectance) correlates positively with Competence and Assertiveness and negatively with Modesty, consistent with its emphasis on intellectual self-confidence.

Tables 56 and 57 demonstrate strong correspondence between the 15FQ+ global factors and the Big Five dimensions assessed by both the NEO PI-R and the NEO FFI, with all correlations substantial in magnitude and statistically significant at p<.001. This pattern is consistent with the theoretical alignment between the 15FQ+ hierarchical structure and the Five Factor Model of personality (Costa & McCrae, 1987), and replicates findings reported in the international manual.

Relationships between the 15FQ+ and Occupational Interest Profile Plus

Table 58. Correlations between the 15FQ+ primary factors and the OIP+ scales

15FQ+ factor	OIP+ scale
A	Scientific (-.46), Logical (-.32), Agreeable (.38)
ß	Managerial (.44)
C	Stability (.64), Scientific (.43), Logical (.43), Extraversion (.35)
E	Managerial (.68), Extraversion (.43)
F	Extraversion (.60), Persuasive (.36), Nurturing (-.33)
G	Conscientiousness (.67), Artistic (-.48), Stability (-.35)
H	Extraversion (.65), Persuasive (.53), Stability (.48)
I	Logical (.51), Artistic (.35)
L	Agreeableness (-.77)
M	Openness (.73), Artistic (.50), Administrative (-.37)
N	Administrative (.41), Managerial (-.35), Extraversion (-.35)
O	Stability (-.63), Persuasive (-.11)
Q1	Persuasive (.43), Extraversion (.31), Optimistic (.31)
Q2	Extraversion (-.65), Optimistic (-.47)
Q3	Optimistic (-.42)
Q4	Stability (-.32)

A sample of 48 adults completed both the 15FQ+ and the Occupational Interest Profile Plus (OIP+) as part of a career guidance process. The OIP+ assesses eight career interest scales and eight personal work needs scales, five of which correspond to Big Five personality dimensions. Table 58 presents correlations between the 15FQ+ primary factors and the OIP+ scales, with correlations below .30 omitted.

The Extraversion primaries *f*F (Enthusiastic), *f*H (Socially-bold), and *f*E (Dominant) all show strong positive correlations with the OIP+ Extraversion work need scale, while fQ2 (Self-sufficient) shows a strong negative association, consistent with their respective positions on the sociability–independence continuum. *f*E (Dominant) and ß (Intellectance) both correlate with the Managerial interest scale, reflecting the association between assertiveness, intellectual confidence, and leadership-oriented occupational interests. *f*N (Restrained) shows a negative relationship with Managerial, consistent with its emphasis on diplomatic restraint rather than directive influence.

The Anxiety primaries *f*C (Emotionally Stable), *f*O (Self-doubting), and *f*Q4 (Tense-driven) all relate to the Stability work need scale in the expected direction, with *f*C showing the strongest positive association and *f*O and *f*Q4 showing negative correlations. This pattern is consistent with the role of emotional stability in sustaining consistent, predictable work performance.

*f*L (Suspicious) shows a strong negative correlation with the OIP+ Agreeableness scale, providing particularly clear convergent evidence for this primary's emphasis on guardedness and interpersonal wariness. *f*M (Abstract) shows its strongest association with OIP+ Openness, along with positive correlations with Artistic interests, consistent with its emphasis on imaginative, conceptually oriented thinking. *f*A (Empathic) shows negative correlations with Scientific and Logical interest scales and a positive association with Agreeable, reflecting the distinction between interpersonal warmth and analytical detachment.

Relationships between the 15FQ+ and Occupational Personality Profile

416 respondents completed both the 15FQ+ and OPPro between January 2020 and May 2024. The 15FQ+ factor Dominant (*ƒ*E) shows a strong positive association with Assertive (r = .71) and meaningful positive correlations with Persuasive and Gregarious, aligning closely with its definition as reflecting interpersonal confidence, influence, and assertiveness. Similarly, Socially-bold (*ƒ*H) correlates strongly with Gregarious (r = .56), Persuasive (r = .57), and Assertive (r = .47), consistent with its emphasis on social confidence, visibility, and ease in interpersonal contexts.

Table 59. Observed Correlation Estimates - 15FQ+ and OPPro

	ASS	CON	ELC	FLE	GRE	PER	PHL	PRA	TRU	SC
***f*A**	-.06	.01	-.04	-.08	.26*	.16*	.01	-.31*	.22*	.11*
ß	.30*	.09	-.25*	-.03	.09	.33*	.32*	-.17*	.16*	.26*
***f*C**	.12*	-.28*	-.49*	-.05	.28*	.15*	.69*	-.11*	.42*	.47*
***f*E**	.71*	.06	-.22*	-.11*	.29*	.38*	.34*	-.01	.01	.17*
***f*F**	.16*	-.03	-.11*	.03	.68*	.43*	.23*	-.13*	.13*	.07
***f*G**	.13*	.08	.09	-.54*	-.07	.02	.04	.08	-.08	.15*
***f*H**	.47*	-.01	-.27*	-.02	.56*	.57*	.48*	-.21*	.14*	.26*
***f*I**	-.18*	-.02	-.09	.20*	-.01	-.10	-.09	-.52*	.17*	-.04
***f*L**	.16*	.33*	.42*	-.20*	-.22*	.07	-.31*	.13*	-.71*	-.21*
***f*M**	.11*	.12*	-.12*	.18*	.11*	.31*	-.06	-.48*	-.01	-.07
***f*N**	-.39*	-.11*	.02	-.26*	-.01	-.15*	.05	-.09	.19*	.19*
***f*O**	-.25*	.30*	.37*	-.05	-.25*	-.23*	-.70*	.04	-.26*	-.44*
***f*Q1**	.22*	.04	-.20*	.37*	.08	.19*	.07	-.27*	.05	.03
***f*Q2**	-.18*	.18*	.16*	-.01	-.76*	-.32*	-.27*	-.01	-.22*	-.18*
***f*Q3**	.08	.09	.17*	-.64*	-.05	-.00	-.01	.18*	-.14*	.10*
***f*Q4**	.16*	.17*	.23*	.02	-.10*	-.04	-.41*	.04	-.31*	-.46*

Note. * Statistically significant at the .05 level. Correlations above 0.30 are highlighted in grey. ASS = Assertive; CON = Contesting; ELC = External Locus of Control; FLE = Flexible; GRE = Gregarious; PER = Persuasive; PHL = Phlegmatic; PRA = Pragmatic; TRU = Trusting; SC = Social Conformity.

Emotionally Stable (fC) demonstrates substantial positive relationships with Phlegmatic (r = .69) and Trusting (r = .42), alongside a strong negative association with External Locus of Control (r = −.49). This pattern is theoretically coherent, reflecting calmness, resilience, and perceived personal control. In contrast, Self-doubting (fO) shows strong negative convergence with Phlegmatic (r = −.70) and Social Conformity (r = −.44), and positive associations with External Locus of Control and Contesting, consistent with apprehension, emotional volatility, and self-questioning.

Interpersonal orientation is further supported by the relationship between Suspicious (fL) and Trusting, where a strong negative correlation (r = −.71) provides particularly clear evidence of convergent construct validity, given the conceptual opposition of these dimensions. Similarly, Empathic (fA) shows positive associations with Gregarious and Trusting, and a negative relationship with Pragmatic, reflecting sensitivity to others versus a task-focused, impersonal orientation.

Abstract (fM) correlates positively with Persuasive and Flexible, and negatively with Pragmatic, reflecting a preference for conceptual, imaginative, and less concrete modes of thinking. Radical (fQ1) shows a positive relationship with Flexible (r = .37), supporting its association with openness to change and innovation.

Conscientious (ƒG) and Self-disciplined (ƒQ3) both show substantial negative correlations with Flexible (r = −.54 and r = −.64 respectively), consistent with preferences for structure, order, and rule-governed behaviour. The association between Restrained (ƒN) and lower Assertive behaviour (r = −.39) further supports its conceptual alignment with caution and behavioural inhibition.

At the same time, the overall pattern of results demonstrates adequate discriminant validity. Many 15FQ+ primaries show weak or near-zero correlations with OPPro dimensions that are not theoretically central to their construct definitions. For example, Tender-minded (ƒI) shows minimal association with assertive or dominance-related dimensions, while Conscientious (ƒG) and Self-disciplined (ƒQ3) do not meaningfully relate to interpersonal influence or sociability scales. This pattern indicates that, although related constructs converge as expected, the instruments are not redundant and do not reflect excessive construct overlap.

Relationships between the 15FQ+ and Occupational Personality Questionnaire – ipsative

Table 60. Observed Correlation Estimates - 15FQ+ and OPQ32i

15FQ+ factor	OPQ scale
fA	Behavioural (.33), Affiliative (.30)
ß	Emotionally Controlled (-.43), Worrying (-.43), Modest (-.34)
fC	Worrying (-.43), Relaxed (.40), Optimistic (.30)
fE	Outspoken (.57), Controlling (.51), Modest (-.49)
fF	Outgoing (.51) Affiliative (.50) Conventional (-.48)
fG	Detail Conscious (.48), Variety Seeking (-.43) Conventional (.36), Innovative (-.35)
fH	Emotionally Controlled (-.57), Worrying (-.53), Modest (-.49), Conventional (-.49),Persuasive (.46)
fI	Worrying (.31)
fL	Trusting (-.39)
fM	Detail Conscious (-.38), Conventional (-.36), Innovative (.35), Conceptual (.32)
fN	Rule Following (.35), Outspoken (-.30)
fO	Worrying (.59), Relaxed (-.45), Conventional (.44), Tough Minded (-.37), Emotionally Controlled (-.36), Socially Confident (-.34)
fQ1	Conventional (-.58), Emotionally Controlled (-.38), Innovative (.37), Rule Following (-.37)
fQ2	Affiliative (-.54), Rule Following (.44), Democratic (-.41)
fQ3	Rule Following (.36), Variety Seeking (-.35)
fQ4	Tough Minded (-.37), Relaxed (-.35), Worrying (.30)

Overall, the pattern of correlations reported in Table 60 for values above ±.30 for clarity demonstrates that the 15FQ+ factors relate meaningfully to established OPQ dimensions, providing evidence of convergent validity. The 15FQ+ factors generally show clear convergence with conceptually related OPQ scales, supporting the expected patterns of personality traits. For example, *f*A (Empathic) correlates positively with Behavioural and Affiliative scales, while ß (Intellectance) shows strong negative associations with Worrying, Emotionally Controlled, and Modest, reflecting greater composure and confidence. Factors capturing sociability and influence, such as *f*E (Dominant) and *f*F (Enthusiastic), correlate positively with Outspoken, Controlling, Affiliative, and Outgoing scales, whereas *f*G (Conscientiousness) and *f*M (Abstract) show associations with Detail Conscious, Innovative, and Conceptual scales, indicating a blend of structured and creative tendencies. Socially bold, as reflected in *f*H, aligns negatively with Worrying, Modest, and Emotionally Controlled, but positively with Persuasive, consistent with interpersonal confidence. Other factors, including *f*N, *f*Q1–*f*Q4, show correlations with Rule Following, Conventional, and Tough Minded scales, supporting interpretations related to compliance, structure, and stress tolerance.

Relationships between the 15FQ+ and Personality & Values Questionnaire

The PVQ incorporates a subset of 15FQ+ personality items alongside values-based scales. Between January 2020 and November 2025, 283 respondents completed both assessments. As a result, correlations reported in Table 61 between the 15FQ+ and the PVQ provide evidence of both equivalent-form reliability (for overlapping personality constructs) and convergent validity (for theoretically aligned but non-identical constructs).

As expected, the strongest correlations are observed along the diagonal (greyed) between corresponding personality scales, with coefficients typically ranging from moderate to strong magnitude ($r \approx .59$ to .82). These findings provide clear support for the equivalence reliability of the PVQ personality scales and confirm that the shared items function consistently across the two instruments.

Table 61. Observed Correlation Estimates - 15FQ+ and PVQ Personality Scales

		15FQ+														
		fA	**ß**	**fC**	**fE**	**fF**	**fG**	**fH**	**fI**	**fL**	**fM**	**fN**	**fO**	**fQ1**	**fQ2**	**fQ3**	**fQ4**
PVQ - Personality	***f*A**	.64*	.29*	.17*	-.06	.29*	.20*	.26*	.34*	.31*	.19*	.22*	.01	.07	.20*	.18*	.13*
	ß	.20*	.74*	.38*	.28*	.17*	.29*	.31*	-.04	.23*	.20*	.28*	.37*	.11*	.19*	.14*	.24*
	***f*C**	.10*	.41*	.79*	.31*	.24*	.29*	.42*	-.19*	.38*	-.09	.34*	.58*	.12*	.35*	.00	.43*
	***f*E**	.04	.30*	.29*	.71*	.26*	.18*	.43*	-.22*	.06	.02	-.11*	.31*	.06	.23*	.06	-.01
	***f*F**	.26*	.19*	.20*	.25*	.80*	-.06	.55*	.12*	.29*	.09	-.11*	.14*	.24*	.43*	-.12*	.09
	***f*G**	.16*	.25*	.20*	.05	-.09	.76*	.00	-.03	.01	-.02	.26*	.15*	-.22*	-.01	.31*	.16*
	***f*H**	.22*	.38*	.39*	.41*	.54*	.06	.82*	-.05	.24*	.16*	.00	.41*	.23*	.40*	-.04	.14*
	***f*I**	.24*	.09	.02	-.19*	-.02	.06	.00	.59*	.23*	.23*	.17*	-.09	.15*	-.04	-.03	.03
	***f*L**	-.13*	-.26*	-.41*	-.11*	-.25*	-.03	-.28*	-.16*	-.82*	-.02	-.24*	-.28*	-.27*	-.41*	.12*	-.30*
	***f*M**	.13*	.11*	-.23*	-.02	.07	-.19*	-.01	.32*	-.04	.71*	-.23*	-.23*	.26*	-.08	-.06	-.12*
	***f*N**	.20*	.16*	.30*	-.14*	-.05	.24*	.06	-.01	.17*	.02	.71*	.19*	-.05	.13*	.18*	.29*
	***f*O**	.04	-.27*	-.46*	-.31*	-.17*	-.10*	-.41*	.25*	-.27*	.16*	-.10*	-.79*	-.11*	-.25*	.11*	-.28*
	***f*Q1**	-.02	.02	-.10*	.05	.13*	-.21*	.11*	.04	.03	.28*	-.23*	-.03	.65*	.07	-.27*	-.03
	***f*Q2**	-.13*	-.15*	-.36*	-.21*	-.49*	.00	-.50*	.00	-.36*	.00	-.13*	-.24*	-.22*	-.73*	.06	-.18*
	***f*Q3**	.18*	.08	.08	-.02	-.09	.29*	-.01	-.09	-.11*	-.06	.22*	.03	-.39*	-.10*	.60*	-.02
	***f*Q4**	-.16*	-.29*	-.54*	-.05	-.16*	-.17*	-.31*	.05	-.36*	.07	-.42*	-.46*	-.16*	-.30*	.05	-.73*

Note. * Statistically significant at the .05 level.

There are also strong correlations between Affiliation (AFFI) and the interpersonal-expressive factors Enthusiastic (ƒF; r = .57) and Socially-bold (ƒH; r = .72), reflecting shared emphasis on sociability, group belonging, and social engagement. Empathic (ƒA) and Tender-minded (ƒI) also relate positively to Affiliation and Altruism (ALTR), supporting the interpretation that these personality dimensions align with concern for others, cooperation, and relational harmony. In contrast, Self-sufficient (ƒQ2) shows a pronounced negative relationship with Affiliation (r = −.65), providing particularly clear evidence of convergent validity, as this factor reflects independence and emotional distance rather than interpersonal connectedness.

The PVQ values scales assess motivational priorities and guiding principles across professional, interpersonal, intrinsic, and extrinsic domains. Associations between the 15FQ+ personality factors and PVQ values, as reported in Table 62, therefore provide evidence of conceptual convergence where enduring personality dispositions are expected to align with stable value orientations, while also allowing examination of construct separation between traits and values.

There are strong correlations between Achievement (ACH), Energy and Drive (DRV), and several task-oriented 15FQ+ factors. Dominant (ƒE), Conscientious (ƒG), Self-disciplined (ƒQ3), and Intellectance (β) all show positive associations with Achievement, reflecting motivation toward accomplishment, standards, and goal-directed behaviour. The strongest

convergence is observed between DRV and Emotionally Stable (ƒC; r = .64), alongside meaningful relationships with Dominant (ƒE), Enthusiastic (ƒF), Socially-bold (ƒH), and Intellectance (β). This pattern is theoretically coherent, as DRV reflects sustained energy, persistence, and initiative, characteristics closely aligned with confidence, resilience, and active engagement. Conversely, Self-doubting (ƒO) and Suspicious (ƒL) show consistent negative relationships with Achievement and Drive, reflecting how anxiety, mistrust, and self-questioning may undermine performance-oriented value priorities.

Table 62. Observed Correlation Estimates - 15FQ+ and PVQ Values Scales

		15FQ+														
		fA	**ß**	**fC**	**fE**	**fF**	**fG**	**fH**	**fI**	**fL**	**fM**	**fN**	**fO**	**fQ1**	**fQ2**	**fQ3**	**fQ4**
PVQ_ Values	**ACH**	.12*	.23*	.15*	.32*	.13*	.29*	.17*	.02	.01	.00	.12*	.02	-.13*	-.10*	.26*	-.04
	AFFE	.31*	-.08	-.14*	-.04	.22*	.06	.02	.18*	-.12*	.15*	.01	.29*	.02	-.11*	.05	.08
	AFFI	.30*	.24*	.39*	.33*	.57*	-.02	.72*	-.04	-.31*	-.04	.09	-.32*	.08	-.65*	-.03	-.31*
	AES	.28*	.18*	.09	.02	.16*	.13*	.18*	.54*	-.22*	.26*	.10*	.05	.02	-.10*	-.01	-.14*
	ALT	.44*	.20*	.09	.02	.15*	.09	.11*	.29*	-.36*	.10*	.16*	.00	.02	-.19*	.03	-.13*
	COM	-.25*	-.24*	-.25*	.00	-.15*	.02	-.12*	-.21*	.63*	.07	-.17*	.20*	-.06	.24*	.14*	.28*
	CON	.17*	.16*	.34*	.03	.17*	.00	.21*	.09	-.47*	-.19*	.21*	-.35*	.05	-.3*	-.09	-.33*
	DRV	.30*	.44*	.64*	.38*	.35*	.21*	.43*	.06	-.44*	-.15*	.26*	-.40*	-.06	-.44*	.11*	-.42*
	FIN	-.04	-.06	-.15*	-.01	.03	-.04	-.05	-.10*	.21*	.03	-.09	.07	-.04	.16*	.06	.16*
	IND	-.27*	-.26*	-.41*	-.15*	-.36*	-.01	-.34*	-.13*	.69*	.12*	-.20*	.33*	-.01	.58*	.10*	.36*
	LTO	.18*	.45*	.49*	.33*	.04	.40*	.26*	.03	-.21*	-.09	.27*	-.32*	.00	-.16*	.25*	-.33*
	MOR	.17*	.14*	.01	.06	-.12*	.30*	-.04	-.03	.10*	-.04	.15*	.10*	-.24*	.07	.54*	.03
	OBJ	-.21*	.26*	.38*	.37*	.00	.19*	.28*	-.31*	-.01	-.20*	.13*	-.34*	-.04	-.11*	.13*	-.23*
	PER	.06	.27*	.19*	.41*	.27*	.03	.51*	-.08	-.07	.25*	-.10*	-.21*	.14*	-.14*	-.03	-.11*
	RES	.24*	.40*	.40*	.26*	.17*	.15*	.24*	.04	-.39*	-.03	.24*	-.25*	.00	-.18*	.11*	-.34*
	SAF	.04	-.13*	-.15*	-.27*	-.22*	.09	-.28*	.18*	.07	-.19*	.12*	.18*	-.21*	.15*	.04	.03
	TRA	-.04	-.06	-.07	.01	-.21*	.25*	-.15*	-.15*	.25*	-.23*	.09	.10*	-.62*	.17*	.47*	.15*
	WOR	.07	.22*	.15*	.21*	-.04	.32*	.10*	-.02	.05	-.01	.06	.02	-.11*	.00	.25*	-.04

Note. * Statistically significant at the .05 level. Correlations above 0.30 are highlighted in grey. ACH = Achievement; AFFE = Affection; AFFI = Affiliation; AES = Aesthetics; ALT = Altruism; COM = Competition; CON = Patience; DRV = Energy and Drive; FIN = Economic Status; IND = Independence; LTO = Long-term Orientation; MOR = Moral Values; OBJ = Objective Thinking; PER = Persuasiveness; RES = Resilience; SAF = Need for Safety; TRA = Traditional; WOR = Work Ethic.

The value Independence (INDE) shows strong positive convergence with Suspicious (ƒL; r = .69) and Self-sufficient (ƒQ2; r = .58), and negative associations with affiliative and emotionally expressive traits. This pattern reflects a coherent motivational orientation toward autonomy, self-reliance, and reduced interpersonal dependence. Similarly, Competition (COM) correlates positively with Suspicious (ƒL) and negatively with Empathic (ƒA), Emotionally Stable (ƒC), and Enthusiastic (ƒF), suggesting that competitive values align more closely with guardedness and self-protective orientations than with warmth or emotional openness.

Aesthetics (AEST) correlates strongest with Tender-minded (ƒI; r = .54) and Abstract (ƒM), reflecting shared emphasis on imagination, emotional sensitivity, and appreciation of symbolic or experiential meaning. These relationships provide clear support for convergent validity in the domain of cognitive–aesthetic orientation. Similarly, Objective Thinking (OBJ) aligns positively with Dominant (ƒE), Emotionally Stable (ƒC), and Intellectance (β), and negatively with Tender-minded (ƒI), reflecting the conceptual distinction between analytical detachment and affective sensitivity.

Values reflecting structure and regulation, such as Traditional (TRAD), Moral Values (MORA), and Work Ethic (WOR), show strongest correlations with Conscientious (ƒG) and Self-disciplined (ƒQ3). In particular, TRAD demonstrates a substantial positive association with Self-disciplined (ƒQ3; r = .47) and a strong negative relationship with Radical (ƒQ1; r = −.62), reflecting opposition between preference for established norms versus openness to change. Work Ethic also correlates positively with Conscientious (ƒG) and Self-disciplined (ƒQ3), supporting their shared emphasis on diligence, responsibility, and persistence.

Need for Safety (SAF) shows modest positive associations with Tender-minded (ƒI) and Emotionally Stable (ƒC), and negative relationships with Dominant (ƒE), Enthusiastic (ƒF), and Socially-bold (ƒH). This pattern reflects a motivational preference for predictability and security that contrasts with assertive, risk-tolerant, or highly expressive behavioural styles.

Overall, the observed relationships between the 15FQ+ and PVQ values scales demonstrate a coherent pattern of theoretically meaningful convergence, particularly in domains relating to achievement motivation, interpersonal orientation, autonomy, and structure. At the same time, the presence of low cross-domain correlations provides reassurance that the instruments assess related but distinct psychological constructs, supporting the appropriate joint use of personality and values measures within integrated assessment batteries.

Relationships between the 15FQ+ and Professional Personality Questionnaire

A sample of 103 volunteers completed both the 15FQ+ and the Professional Personality Questionnaire (PPQ), a measure based on the Five Factor Model of personality. Table 63 presents correlations between the 15FQ+ primary factors and the PPQ scales, with correlations below .30 omitted for clarity.

Table 63. Correlations between the 15FQ+ primary factors and the PPQ scales

	Insecure	Tender	Extraversion	Conscientiousness	Unconventionality
A		.57	.27		
ß	-.38				
C	.52				
E	-.31	.39	.38		
F	-.34		.51		
G				.52	
H	-.39		.45		
I	-.36				
L					
M					.38
N					
O	.58				
Q1				-.42	.31
Q2			-.58		
Q3				.31	-.39
Q4	.46				

The PPQ Insecure dimension shows its strongest associations with the Anxiety global factor primaries: *f*O (Self-doubting), *f*C (Emotionally Stable; negative), and *f*Q4 (Tense-driven), consistent with the conceptual alignment between neuroticism and anxiety-related traits. Smaller but meaningful negative correlations with ß (Intellectance), *f*E (Dominant), *f*H (Socially-bold), and *f*I (Tender-minded) are interpretable given that these primaries reflect forms of social or intellectual confidence, which would be expected to relate inversely to anxiety. PPQ Extraversion correlates with the Extraversion primaries *f*F (Enthusiastic), *f*H (Socially-bold), and *f*E (Dominant), while *f*Q2 (Self-sufficient) shows a strong negative association, consistent with its emphasis on independence. PPQ Conscientiousness shows a clear positive correlation with *f*G (Conscientious), providing direct convergent evidence for this primary. The PPQ Tender dimension correlates with *f*A (Empathic), reflecting shared interpersonal warmth content.

Notably, no meaningful correlations were observed between the Openness primaries and the PPQ Unconventionality dimension, with the exception of modest associations with *f*M (Abstract) and *f*Q1 (Radical). This pattern suggests that the Unconventionality dimension as operationalised in the PPQ does not fully capture the breadth of the Openness construct as assessed by the 15FQ+, rather than indicating a validity concern for the 15FQ+ primaries.

Relationships between the 15FQ+ and Values and Motives Inventory

The VMI assesses core motivational drivers and value orientations underlying work and life preferences. As such, correlations between the 15FQ+ personality factors and VMI dimensions reported in Table 64 provide evidence of convergent validity where dispositional tendencies are theoretically expected to align with particular value priorities, while low or inconsistent correlations support discriminant validity between personality traits and motivational content. 1989 respondents completed both assessments between January 2020 and June 2024, and their responses were used to evaluate the relationships between these two measures.

Table 64. Observed Correlation Estimates _ 15FQ+ and VMI

	TRA	FIN	SEC	ALT	AFFI	AES	ETH	MOR	AFFE	IND	ACH
***f*A**	.15*	-.07*	.07*	.35*	.27*	.27*	.09*	.18*	.34*	-.12*	.04*
ß	.11*	.04*	-.06*	.17*	.02	.27*	-.06*	.24*	.02	-.05*	.01
***f*C**	.21*	-.13*	.03*	.09*	.17*	.13*	-.08*	.28*	-.04*	-.29*	.00
***f*E**	.14*	.17*	-.10*	-.06*	.14*	.07*	-.05*	.14*	.03*	-.06*	.03*
***f*F**	.08*	.14*	-.27*	.14*	.44*	.08*	.04*	-.03*	.30*	-.08*	-.04*
***f*G**	.28*	-.05*	.24*	.05*	-.01	.09*	-.08*	.27*	.01	-.20*	.06*
***f*H**	.23*	.03*	-.07*	.05*	.35*	.22*	-.05*	.12*	.19*	-.14*	.09*
***f*I**	-.02	-.12*	.16*	.21*	-.01	.53*	.08*	.08*	.17*	-.02	.06*
***f*L**	.03*	.10*	.06*	-.32*	-.23*	-.17*	-.04*	-.17*	-.17*	.20*	.03*
***f*M**	-.14*	.10*	-.19*	.10*	.03*	.28*	.06*	-.10*	.15*	.23*	.02
***f*N**	.26*	-.10*	.27*	.11*	.07*	.12*	-.03*	.22*	.06*	-.23*	.07*
***f*O**	-.14*	.10*	.05*	.04*	-.10*	-.07*	.08*	-.13*	.12*	.21*	.01
***f*Q1**	-.32*	.05*	-.23*	-.02	-.03*	.09*	-.02	-.20*	-.01	.25*	-.02
***f*Q2**	-.19*	-.02	.06*	-.11*	-.67*	-.07*	.02	-.05*	-.30*	.19*	-.04*
***f*Q3**	.42*	.00	.13*	-.01	.05*	-.10*	.12*	.25*	.02	-.18*	.09*
***f*Q4**	-.18*	.21*	-.10*	-.16*	-.13*	-.17*	.08*	-.19*	.02	.26*	-.02

Note. * Statistically significant at the .05 level. Correlations above 0.30 are highlighted in grey. TRA = Traditional; FIN = Financial; SEC = Security; ALT = Altruistic; AFFI = Affiliative; AES = Aesthetics; ETH = Ethical; MOR = Moral; AFFE = Affection; IND = Independence; ACH = Achievement

The overall correlation magnitudes are generally small to moderate, and many 15FQ+ primaries show weak or negligible relationships with VMI values that are not central to their conceptual definitions, supporting predominantly discriminant validity, that while personality dispositions influence value priorities, the instruments are not redundant and assess related but distinct psychological domains.

There are however some instances where convergent patterns emerge. For example, Empath (ƒA) shows consistent positive relationships with Altruistic, Affection, Affiliative, and Aesthetics values, reflecting a motivational orientation toward concern for others, relational harmony, and sensitivity to interpersonal and aesthetic considerations. This pattern is

consistent with the interpersonal warmth and emotional sensitivity captured by this primary factor.

Similarly, Enthusiastic (ƒF) and Socially-bold (ƒH) demonstrate moderate to strong associations with Affiliative, Affection, and Aesthetics values, indicating that individuals who are socially expressive and confident are also motivated by social connection, expressive engagement, and interpersonal stimulation. These findings align well with the extraversion-related content of these scales.

Stronger correlations are also observed for emotional regulation and self-control constructs. Emotionally Stable (ƒC) shows positive relationships with Moral and Traditional values and a negative association with Independence, suggesting a preference for predictability, emotional restraint, and socially anchored value systems. In contrast, Self-doubting (ƒO) and Tense-driven (ƒQ4) display small but consistent associations with Independence and Financial values, reflecting concern with personal security, uncertainty management, and externally driven motivators.

Motivational autonomy is particularly well reflected in the relationships involving Self-sufficient (ƒQ2). This factor shows strong negative correlations with Affiliative and Affection values, and a positive relationship with Independence, providing especially clear evidence of convergent validity given the conceptual opposition between interpersonal dependence and self-reliance.

Order, discipline, and normative regulation are also coherently represented. Self-disciplined (ƒQ3) correlates positively with Traditional, Moral, and Security values, indicating a preference for structure, rule adherence, and ethical consistency. Conscientious (ƒG) similarly shows positive relationships with Traditional, Security, and Moral values, reinforcing the alignment between behavioural regulation and value-driven orderliness.

Creativity- and openness-related constructs show selective and meaningful convergence. Tender-minded (ƒI) and Abstract (ƒM) are positively associated with Aesthetics, reflecting an appreciation for imagination, symbolism, and subjective experience. Radical (ƒQ1) demonstrates a negative relationship with Traditional values and a positive association with Independence, consistent with its emphasis on innovation, non-conformity, and openness to change.

Overall, the observed relationships between the 15FQ+ and the VMI demonstrate a coherent pattern of convergence where dispositional traits are theoretically expected to align with motivational values, alongside low cross-domain associations elsewhere. These findings provide further support for the construct validity of the 15FQ+ within integrated personality–

values assessment frameworks, and are consistent with its intended use in comprehensive occupational and developmental profiling.

Relationships between the 15FQ+ Intellectance and reasoning ability

As indicated earlier, the 15FQ+ Intellectance scale (ß) is not a measure of reasoning ability, unlike Factor B in the 16PF. Rather, ß is a metacognitive personality trait assessing confidence in one's intellectual abilities. Table 65 presents correlations between ß and a range of reasoning ability measures across several independent samples.

Table 65. Correlations between 15FQ+ Intellectance (ß) and reasoning ability measures

GRT2 (n=28)		**GRT1 (n=34)**		**CRTB2 (n=32)**		**ART (n=132)**	
Verbal	.10	Verbal	.29	Verbal	.32	Abstract	.32
Numerical	.38	Numerical	.20	Numerical	.12		
Abstract	.23	Abstract	.27				

Note. GRT2 = General Reasoning Test Battery; GRT1 = Graduate Reasoning Test Battery; CRTB2 = Critical Reasoning Test Battery; ART = Abstract Reasoning Test

Across all samples and reasoning measures, correlations between ß and objective ability are modest, typically in the region of .20 to .38, with the exception of VR2 (.10) and NCR2 (.12). This pattern indicates a small but consistent positive relationship between intellectual self-confidence and measured reasoning ability, which is to be expected given that individuals with stronger reasoning skills are likely to have had more positive experiences of intellectual challenge and performance. However, the modest magnitude of these correlations confirms that ß and reasoning ability are substantially distinct constructs, and that ß should not be interpreted as a proxy for cognitive ability in occupational assessment contexts. As a supplementary observation, performance on the EFPA Level 2 Test User (Occupational Personality) final assessment was modestly correlated (r=.31) with ß, consistent with the role of intellectual self-confidence in professional competence development.

Criterion Validity

Criterion validity refers to the extent to which assessment scores relate to meaningful real-world outcomes, and represents a central pillar of evidence for the applied utility of personality measures in occupational contexts (Sackett et al., 2022). The studies reported in this section examine the criterion-related validity of the 15FQ+ across a range of occupational samples and performance criteria, including sales production, merit ratings, interview performance, health and safety outcomes, and managerial competency profiles. Both predictive validity designs, in which 15FQ+ scores were obtained prior to the criterion measure, and concurrent validity designs, in which scores and criteria were collected within the same timeframe, are represented. Taken together, the findings provide converging evidence that the 15FQ+ demonstrates meaningful relationships with occupationally relevant criteria, supporting its use in selection, development, and organisational assessment contexts.

Predictive Validity: Insurance Sales Agent Success

The predictive validity of the 15FQ+ and Critical Reasoning Test Battery (Version 2) was examined in a sample of 84 insurance sales agents, for whom a full year of production data and number of policies sold was also available.

A multiple regression analysis was conducted to examine whether 15FQ+ personality factors and numerical critical reasoning predicted annual production, and is presented in Table 66. The overall model was significant, $F(9, 74) = 6.42$, $p < .001$, explaining approximately 44% of the variance in production ($R^2 = .44$; adjusted $R^2 = .37$).

Table 66. Multiple Regression: Production Prediction

Predictor	β	B	SE (B)	t	p
Enthusiastic (*f*F)	.330	229 170	74 544	3.07	.003
Numerical Critical Reasoning	.277	194 493	70 462	2.76	.007
Intellectance (ß)	−.342	−210 758	61 210	−3.44	< .001
Empathic (*f*A)	.329	259 242	87 473	2.96	.004
Tender-minded (*f*I)	−.313	−195 430	70 740	-2.76	.007
Abstract (*f*M)	.076	53 750	76 609	0.70	.485
Suspicious (*f*L)	−.168	−106 352	65 506	−1.62	.109
Self-sufficient (*f*Q2)	.187	124 872	76 861	1.62	.108
Socially-bold (*f*H)	.130	70 204	62 941	1.12	.268

Agents with higher levels of enthusiasm and numerical critical reasoning, together with greater empathy, tended to achieve higher annual production levels, suggesting that a combination of energetic, empathic engagement and applied reasoning ability is most conducive to higher production performance.

A second regression analysis examined prediction of the number of policies sold. The overall model was statistically significant, $F(8, 76) = 6.09$, $p < .00001$, explaining approximately 39% of the variance in sales performance (Adjusted $R^2 = .33$), and is reported in Table 67.

Table 67. Multiple Regression: Number of Policies Sold

Predictor	β	B	SE (B)	t	p
Enthusiastic (*f*F)	.466	3.55	.83	4.27	< .001
Intellectance (ß)	-.325	-2.20	.64	-3.42	.001
Tender-minded (*f*I)	-.259	-1.78	.76	-2.33	.022
Socially-bold (*f*H)	.249	1.47	.71	2.07	.042
Self-sufficient (*f*Q2)	.241	1.75	.85	2.06	.042
Empathic (*f*A)	.210	1.80	.99	1.82	.073
Self-doubting (*f*O)	.178	.97	.58	1.66	.101
Suspicious (*f*L)	-.124	-.86	.72	-1.19	.237

Overall, the findings suggest that high-volume policy sales are most strongly associated with an enthusiastic, socially confident, self-directed interpersonal style, rather than a highly analytical or emotionally detached approach.

Predictive Validity: Petrochemical Manufacturing Employees

550 employees in the petrochemical manufacturing industry had their performance appraisal ratings correlated with their 15FQ+ profiles. Statistically significant associations indicated that higher merit ratings were modestly related to greater dominance (fE), a more trusting interpersonal style (lower fL), a more direct behavioural approach (fN), and higher levels of tension (fQ4).

The overall pattern in Table 68 suggests that merit performance ratings are weakly associated with assertive, task-focused, and driven behavioural tendencies. However, the low magnitude of these correlations indicates that personality factors alone account for only a limited proportion of variance in merit ratings. These findings should therefore be interpreted as supportive but modest evidence of criterion-related validity, and underscore

the importance of multivariate and configurational approaches when linking personality to job performance.

Table 68. 15FQ+ and Merit Rating Correlations

15FQ+ Scale	Average Merit Rating
fA	−.08
fB	−.02
fC	.08
fE	**.19***
fF	−.09
fG	−.03
fH	.03
fI	−.03
fL	**−.18***
fM	.05
fN	**−.14***
fO	−.05
fQ1	.02
fQ2	.01
fQ3	−.08
fQ4	**.13***

Predictive Validity: Senior Technical Officers Performance

125 Senior technical officers in the electricity supply industry completed the 15FQ+ and underwent an interview. The significant correlations between their interview performance and 15FQ+ scores are summarised in Table 69. Their 15FQ+ scores were also later correlated with number of sick days taken within a 2-year period and on-site accident data, which is reported in Table 70. Higher levels of emotional stability (fC) were associated with fewer days of sick leave and fewer accidents, while higher levels of apprehension (fO) were related to increased sick leave. With respect to accidents, modest positive associations were observed for abstract thinking (fM) and radical or change-oriented tendencies (fQ1), while a more restrained behavioural style (fN) was associated with fewer reported accidents. Empathy (fA) also showed a small positive relationship with accident involvement.

Table 69. Predicting Interview Performance

Interview dimension	Multiple R (p-level)	Significant scales (Beta)
Technical	.56 (001)	Tense-driven (fQ4).(.39) Radical (fQ1) (.38) Socially bold (fH) (.59) Dominant (fE) (.33)
Customer service	.48 (.01)	Empathic (fA) (.32)
Coaching	.57 (.002)	Socially Bold (fH) (.49) Self-disciplined (fQ3) (.26) Dominant (fE) (.31)
Innovation	.49 (.014)	Dominant (fE) (.35) Socially Bold (fH) (.37)
Motivational	.43 (.023)	Dominant (fE) (.36)

Table 70. Correlating 15FQ+ with Sick Leave and Accidents

15FQ+ Scale	Sick Leave (2 years)	Number of Accidents
fA	.05	**.20***
fB	−.11	.06
fC	**−.33***	**−.21***
fE	.05	.09
fF	.15	−.07
fG	−.01	−.01
fH	.01	.10
fI	−.03	.11
fL	.06	−.07
fM	−.01	**.22***
fN	−.04	**−.16***
fO	**.28***	.08
fQ1	.04	**.32***
fQ2	−.08	.07
fQ3	−.01	.05
fQ4	.14	−.03

Overall, these findings suggest that emotional regulation and behavioural control may play a modest protective role in health- and safety-related outcomes. However, the generally low magnitude of correlations indicates that personality factors alone account for a limited proportion of variance in absenteeism and accident rates. These results should therefore be interpreted as supportive but supplementary evidence of criterion-related validity, best considered alongside organisational, environmental, and job-specific risk factors.

Concurrent Validity: Insurance Industry Managerial Competence

Concurrent validity of the 15FQ+ was examined using data from 160 senior managers within a large insurance organisation. The sample comprised predominantly male managers (85%), with a mean age of approximately 40 years (SD ≈ 6.6).

Managerial competency ratings were analysed in conjunction with the 15FQ+ and the Values and Motives Inventory (VMI) to evaluate the extent to which personality traits and motivational drivers jointly differentiated managerial competency profiles.

Discriminant Function Analyses were conducted for each competency area and is summarised in Table 71. Overall, statistically significant relationships were found across all competencies, with classification accuracy generally strongest for the more frequently occurring competency categories.

Across competencies, the findings provide strong support for the concurrent validity of combinations of 15FQ+ personality factors and Values and Motives Inventory (VMI) scales. The results demonstrate that managerial competencies are best understood as integrated behavioural patterns, rather than the outcome of isolated personality traits.

Table 71. Concurrent Validity: Insurance Industry Senior Managers

Competency	Wilks' λ	p-value	Primary Contributing Scales	Classification Accuracy
Conceptual	.305	< .001	VMI: Altruism 15FQ+: Suspicious (fL), Self-discipline (fQ3), Tense-driven (fQ4)	~69%
Networking	.444	< .001	VMI: Affiliation, Traditional Values, Aesthetics, Altruism	~77%
Results Orientation	.702	< .022	VMI: Affection, Ethical, Security, Affiliation 15FQ+: Emotionally Stable (fC), Tense-driven (fQ4), Intellectance (B)	~67%
Client & People Orientation	.489	< .002	VMI: Traditional, Ethics, Affiliation, Security 15FQ+: Suspicious (fL)	~69%
Facilitating	.513	< .015	VMI: Altruism 15FQ+: Dominance (fE), Enthusiasm (fF)	~68%
Influencing	.472	< .009	VMI: Altruism	~57%
Business Acumen	.435	< .001	VMI: Altruism, Achievement, Financial Security	~68%
Self-Renewal	.751	< .039	15FQ+: Self-doubting (fO)	~72%

NORMS

Raw scores on the 15FQ+ primary and global scales are transformed into standardised scores using normative reference distributions derived from local samples. For reporting purposes, scores are primarily expressed as sten scores, which allow for interpretation of relative standing within the selected norm group. Where applicable, percentile ranks are also reported to indicate the proportion of the normative sample scoring at or below a given raw score.

Users are advised to select norm groups that are most appropriate to the assessment context and target population, taking into account variables such as occupational level, age range, and language background. Norm groups should not be selected solely to obtain more favourable score profiles. Interpretations should always be grounded in the purpose of the assessment and supported by multiple sources of information.

Table X lists the most recent norms (as of March 2026) available on the 15FQ+ across countries and language groups. The UK norm suite continues to be developed and updated as additional data become available, and users are encouraged to select the most current and contextually appropriate norm group for each assessment application. Where no suitable local norm is available, the International English Speaking Professionals and Managers norm (n = 27,940) may be used as a broad reference group. Additional norm groups may be requested via info@psytech.co.uk and viewed on the GeneSys platform.

Table 72. 15FQ+ Norms on GeneSys (2026)

Country	Norm Name on GeneSys	Sample Size	Date Updated
Argentina	AR Professional People	513	2025
Asia Pacific	APA Senior Managers	1401	2015
Asia Pacific	APA Working Age Adults	4247	2015
Asia Pacific	APA Professionals and Managers	8438	2015
Australia	AUS Senior Managers	740	2015
Australia	Australian Respondents 2020s	2638	2025
Australia	AUS General Applicants	5119	2025
Australia	AUS Professionals and Managers	6144	2016
Australia	AUS Working Age Adults	32750	2015
Brazil	BR Professional People	497	2025
Chile	CL Professional People (Updated 2025)	4176	2025
China	CH Professionals and Managers	12463	2015
China	CH Working Age Adults	18572	2015
Colombia	CO Professionals and Managers	495	2025
Denmark	DK Professional Sample	234	2016
Denmark	DK Managers	1345	2024
Europe	EU Working Age Adults	6361	2016

Gulf Council	GCC Professionals & Managers (AR)	1746	2015
Gulf Council	GCC General Population	12310	2016
India	IN Indian Professionals & Managers	17979	2025
Indonesia	ID Professional / Managerial Applicants	13806	2023
International	INT International English Speaking Professionals and Managers	27940	2015
Italy	IT Campione Normativo (Femmine)	5557	2016
Italy	IT Campione Normativo (Maschi)	8417	2016
Italy	IT Campione Normativo	14212	2016
Italy	IT Professional People (Updated 2025)	37417	2025
Latin America	LAT Senior Managers	1046	2015
Latin America	LAT Working Age Adults (ES)	5672	2015
Latin America	LAT Professionals and Managers	6441	2015
New Zealand	NZ Defence Force Staff	121	2017
New Zealand	NZ Process Workers/Industrial Staff	179	2017
New Zealand	NZ Marketing Staff	200	2017
New Zealand	NZ Hospitality Industry	207	2017
New Zealand	NZ Supervisors & Team Leaders	211	2017
New Zealand	NZ Students & School Leavers	215	2017
New Zealand	NZ Agribusiness Industry	216	2017
New Zealand	NZ Trades-people & Certified Workers	223	2017
New Zealand	NZ Compliance Industry Staff	223	2017
New Zealand	NZ Health Industry Staff	226	2017
New Zealand	NZ Local Government Sector	227	2017
New Zealand	NZ Consulting Industry	236	2017
New Zealand	NZ Education/Training Industry	241	2017
New Zealand	NZ Accounting Industry	250	2017
New Zealand	NZ State Owned Corporation Sector	256	2017
New Zealand	NZ Banking and Finance Industry	265	2017
New Zealand	NZ Human Resources Staff	274	2017
New Zealand	NZ Compliance Industry	281	2017
New Zealand	NZ Information Technology Industry	298	2017
New Zealand	NZ Polytech/TAFE/Institute Graduates	298	2017
New Zealand	NZ Manufacturing/Assembly Staff	336	2017
New Zealand	NZ Customer Service Staff	405	2017
New Zealand	NZ Health Industry	458	2017
New Zealand	NZ Industry Trade/Trained Respondents	462	2017
New Zealand	NZ Private Sector	476	2017
New Zealand	NZ Clerical & Administration Staff	486	2017
New Zealand	NZ Sales Staff	489	2017
New Zealand	NZ Senior Managers	499	2015

New Zealand	NZ Manufacturing and Assembly Industry	532	2017
New Zealand	NZ Managers	537	2017
New Zealand	NZ Retail Industry	571	2017
New Zealand	NZ Certificate/Diploma Holders	620	2017
New Zealand	NZ Recent Graduates	828	2017
New Zealand	NZ Professionals	837	2017
New Zealand	NZ Professional/Managerial	1184	2023
New Zealand	NZ Corporate/Multinational Sector	1245	2017
New Zealand	NZ Professionals and Managers	6681	2015
New Zealand	NZ Working Age Adults	7916	2015
Oman	OM Professionals and Managers	362	2016
Oman	OM Working Age Adults	1048	2016
Panama	PA Población General	5267	2018
Philippines	PH Working Age Adults	213	2015
Philippines	PH Professional People	327	2025
Russia	RU Professionals and Managers	2719	2015
Russia	RU Working Age Adults	3423	2015
Saudi Arabia	KSA Telecoms & IT Professionals & Managers	1123	2019
Serbia	RS Serbian Professional People	3066	2025
Singapore	SNG Working Age Adults	1763	2016
South Africa	RSA siSwati Speakers	112	2016
South Africa	RSA Tshivenda Speakers	149	2016
South Africa	RSA Xitsonga Speakers	192	2016
South Africa	RSA Contact Centre Staff	290	2016
South Africa	RSA Utility Security Staff	520	2016
South Africa	RSA Sepedi Speakers	590	2016
South Africa	RSA Setswana Speakers	660	2016
South Africa	RSA Sesotho Speakers	664	2016
South Africa	RSA Young People (18-21) Updated 2025	668	2025
South Africa	RSA isiXhosa Speakers updated	886	2016
South Africa	RSA Sales Representatives (Updated 2025)	1153	2025
South Africa	RSA isiZulu Speakers	1426	2016
South Africa	RSA IT & Communications Professionals (Updated 2025)	2504	2025
South Africa	RSA Afrikaans Speakers	2999	2016
South Africa	RSA Indigenous Language Groups	4734	2016
South Africa	RSA English Speakers	5473	2016
South Africa	RSA Senior Managers & Chief Executives	9409	2025
South Africa	RSA Aggregate Population	20374	2016
South Africa	RSA Managers (Updated 2025)	21564	2025
South Africa	RSA Graduates (Updated 2025)	22591	2025
South America	LAT Professionals	1210	2016
South America	LAT Senior Executives (Updated 2025)	1325	2025
Spain	ES Spanish Professional People	461	2014

Spain	LAT Managers	4746	2025
Spain	LAT Graduates (Updated 2025)	7760	2025
Spain	LAT Professional People	13595	2025
Thailand	TH Professionals and Managers	1204	2015
Thailand	TH General Population	1483	2014
Thailand	TH Working Age Adults	2761	2015
Turkey	TUR Profesyoneller ve Yoneticiler	1729	2016
Turkey	TUR Calisan Yetiskinler	3461	2016
UAE	UAE Respondents (Updated 2025)	6519	2025
UAE	UAE Graduates and Managers	1150	2020
UAE	UAE Professional Managerial	2065	2019
Ukraine	UA Working Age Adults	1680	2021
United Kingdom	UK Senior Managers	951	2015
United Kingdom	UK Admin staff	3385	2025
United Kingdom	UK Working Age Adults	5988	2015
United Kingdom	UK Professionals and Managers (Updated 2015)	7031	2015

SUMMARY

The psychometric properties of the 15FQ+ were evaluated on a large and occupationally diverse UK sample collected between January 2020 and December 2025. Overall, the assessment demonstrates strong psychometric properties and is considered appropriate for use within UK occupational assessment contexts. The following points summarise the key findings of the psychometric analyses reported in this manual:

- Internal consistency reliability for Form A primary scales was acceptable to good across the overall sample, with McDonald's omega coefficients ranging from .65 to .84 (median ω = .76). Reliability estimates were broadly stable across gender groups, and modestly lower for Other Ethnicity and non-English first language subgroups, a pattern attributed to language proficiency effects rather than construct-level bias. Form C reliability was systematically lower than Form A across all scales (ω range .50–.74, median ω = .62), consistent with the reduction in item count, and is considered appropriate for screening and research applications rather than high-stakes individual decision-making.
- Test-retest reliability over short intervals (2–4 weeks, n = 134) indicated good temporal stability, with coefficients ranging from .57 to .81 (median r = .70), supporting the consistency of trait measurement across repeated administrations. Over longer intervals (6–12 months, n = 149), stability coefficients were moderate (range .45–.65, median r = .57), consistent with the personality change literature and reflecting the expected attenuation of trait consistency over time.
- Alternate-form reliability between Form A and Form C was strong (uncorrected correlations range .81–.94, median r = .89), indicating that the two forms assess the same underlying constructs and that scores are broadly comparable across forms, albeit with the reduced precision expected of the shorter version.
- Statistically significant mean score differences were observed across some demographic groups; however, effect sizes were generally small and consistent with established personality research. Where gender, ethnic, and language differences were present, they could largely be interpreted as reflecting substantive trait variation across groups rather than measurement bias, and are consistent with socio-cultural and contextual factors documented in the broader personality literature. They do not raise concerns regarding the equitable use of the instrument, but practitioners are advised to consider demographic context when interpreting profiles.
- Confirmatory factor analyses provided strong support for the structural validity of both the primary and global factor models of the 15FQ+. For the primary scales, model fit indices indicated acceptable to good fit across the overall sample. Global factor CFAs yielded systematically lower incremental fit indices than primary scale models, as expected for

higher-order constructs spanning multiple heterogeneous primaries, with RMSEA and SRMR values remaining within acceptable ranges across all five global factors.

- Fit patterns were highly consistent across gender, ethnicity, and language subgroups for both primary and global factor models, supporting structural equivalence across demographic groups. This indicates that the 15FQ+ measures the same underlying constructs in the same way across relevant subpopulations, and that observed score differences reflect genuine trait variation rather than differential item functioning at the structural level.
- Rasch analyses of the primary scales indicated that items generally fit the measurement model well across all 16 primary scales. Infit statistics fell within acceptable ranges for the large majority of items, supporting the unidimensionality assumptions of each scale and the alignment of item responses with expected patterns across trait levels. While a small number of Outfit statistics exceeded the conventional threshold, indicating some sensitivity to outlying responses for these items, they are not considered to indicate construct-level misfit.
- DIF analyses across gender, ethnicity, and language groups provided broad support for the fairness and cross-group comparability of the 15FQ+ primary scales. The majority of scales demonstrated excellent to good invariance, with high Spearman rank correlations in item difficulty ordering and small median rank shifts across all three demographic comparisons.
- Inter-scale correlations among the primary factors were predominantly small to moderate, with no pairings approaching problematic overlap. These patterns support the discriminant validity of the primary factors and confirm that the global factors represent coherent higher-order dimensions rather than statistical artefacts.
- Convergent validity evidence was obtained from a broad range of studies using established personality and individual difference measures. The 15FQ+ demonstrated theoretically coherent relationships with a number of personality assessments, with convergent associations most clearly observed for conceptually aligned constructs and low cross-domain correlations supporting discriminant validity.
- Criterion validity evidence was obtained from several occupational samples, including insurance sales, petrochemical manufacturing, technical officers, and senior managers, across a range of performance criteria.
- A comprehensive set of norm groups is available for use with the 15FQ+ on the GeneSys platform, spanning more than 30 countries and a wide range of occupational, demographic, and language-based reference groups. UK-specific norms include Working Age Adults, Professionals and Managers, Senior Managers, and Administrative Staff.

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