



15 Factor Questionnaire Plus

15FQ+ SA User Guide

2026 update

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REVIEW CERTIFICATE

This document hereby certifies that

FIFTEEN FACTOR QUESTIONNAIRE PLUS

meets the minimum standard for use in the South African context according to the Assessment Standards South Africa criteria.

This certificate is valid until:

6th May 2036

DATE:

6th May 2026

SIGNED:

Cas Prinsloo

assessment
STANDARDS *SA*

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 15FQ+ South African technical supplement should be read in conjunction with the international 15FQ+ Manual (2018), which provides a detailed account of the theoretical foundations, scale development, international psychometric properties, and global applications of the instrument. The present supplement focuses specifically on issues relevant to the South African context, including appropriate use, professional requirements, and local psychometric evidence.

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 or 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 Grade 12 (NQF Level 4), or an equivalent qualification. Respondents should also have adequate English literacy so that they are able to understand the item content and respond 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

In accordance with the Health Professions Act No. 56 of 1974, measures of personality functioning are considered psychological assessments. As such, the 15FQ+ should be administered, scored, and interpreted by appropriately trained and registered psychology professionals (psychologists, psychometrists, and registered counsellors), in accordance with ethical guidelines, relevant legislation, and the standards set by the Health Professions Council of South Africa (HPCSA). To support competent use, training in the administration and interpretation of Psytech personality instruments is available. The standard Psytech Personality Tests Training covers the Fifteen Factor Questionnaire Plus (15FQ+), the Occupational Personality Profile (OPPro), and the Jung Type Indicator (JTI), and is designed to ensure that practitioners:

- understand the constructs measured by each instrument and the different psychometric approaches used to assess personality;
- are aware of the contexts and purposes for which each assessment is appropriate;
- understand considerations related to cross-cultural application and language proficiency;
- have a working knowledge of the reliability, validity, and norm groups associated with the 15FQ+ and related instruments;
- can interpret primary scales, second-order factors, and derived scores accurately;
- can use computer-generated reports responsibly and professionally;

- understand the importance of the validation interview and ethical feedback practices; and
- are familiar with the typical behavioural patterns associated with low and high scores on each scale.

This online training is presented over one and a half days and is accredited for Continuing Education Units (CEUs). Practitioners are encouraged to consult the latest Psytech Training Catalogue for current training schedules and additional details.

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 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 Fifteen Factor Questionnaire Plus (15FQ+) was developed in 1998 as a revision and extension of the original 15FQ, published by Psytech International in the mid-1980s. The instrument assesses 15 broad personality factors derived from Cattell's model of normal personality functioning, together with an additional metacognitive personality dimension, Intellectance (β). Intellectance 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.

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.

The English-language international questionnaire of the 15FQ+ is the version administered in South Africa. While this supplement focuses on its appropriateness, use, and psychometric performance in the South African context, the development processes outlined below form the foundational basis for the measure as used locally and illustrate the procedures through which content validity was established. The full development process, described in detail in the international *15FQ+ Technical Manual*, comprised the following key stages:

- **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.

- **Trialling and construct alignment:** Trial items were administered alongside Form A of the 16PF (Fourth Edition). This cross-validation confirmed that 15FQ+ items aligned with the intended personality dimensions, supporting construct continuity with established Cattell-based measures.
- **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.
- **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.
- **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 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 1. 15FQ+ primary scales

Scale	Low scorers	High scorers
Factor A (<i>fA</i>)	Distant Aloof	Empathic
Intellectance (<i>β</i>)	Low Intellectance	High Intellectance
Factor C (<i>fC</i>)	Affected by Feelings	Emotionally Stable
Factor E (<i>fE</i>)	Accommodating	Dominant
Factor F (<i>fF</i>)	Sober Serious	Enthusiastic
Factor G (<i>fG</i>)	Expedient	Conscientious
Factor H (<i>fH</i>)	Retiring	Socially-bold
Factor I (<i>fI</i>)	Hard-headed	Tender-minded

Factor L (<i>f</i> L)	Trusting	Suspicious
Factor M (<i>f</i> M)	Concrete	Abstract
Factor N (<i>f</i> N)	Direct	Restrained
Factor O (<i>f</i> O)	Confident	Self-doubting
Factor Q1 (<i>f</i> Q1)	Conventional	Radical
Factor Q2 (<i>f</i> Q2)	Group-orientated	Self-sufficient
Factor Q3 (<i>f</i> Q3)	Informal	Self-disciplined
Factor Q4 (<i>f</i> Q4)	Composed	Tense-driven

Table 2. 15FQ+ global factors

Global Factor	Contributing Primary Scales
Extraversion–Introversion	<i>f</i> A, <i>f</i> F, <i>f</i> H, <i>f</i> Q2
Low aNxiety–High aNxiety	<i>f</i> C, <i>f</i> L, <i>f</i> O, <i>f</i> Q4
Pragmatism–Openness (to Experience)	<i>f</i> A, <i>f</i> I, <i>f</i> M, <i>f</i> Q1
Independence–Agreeableness	ß, <i>f</i> E, <i>f</i> L, <i>f</i> Q1
Low self-Control–High self-Control	<i>f</i> G, <i>f</i> N, <i>f</i> Q3

Table 3. 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 4. 15FQ+ Criterion-derived Scales

Scale	Function
Emotional Intelligence (elQ)	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 = $fA+$, $fF+$, $fH+$, $fQ2-$
- High scores (Introversion): Prefer solitary environments, require less social contact, are more inwardly focused, drawing energy from reflection and internal experience.
Primary scales = $fA-$, $fF-$, $fH-$, $fQ2+$

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 = $fC+$, $fL-$, $fO-$, $fQ4-$
- High scores (High Anxiety): Increased emotional sensitivity and vulnerability, greater worry, tension, mood fluctuation, and reactivity to stressors.
Primary scales = $fC-$, $fL+$, $fO+$, $fQ4+$

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 = $fA-$, $fI-$, $fM-$, $fQ1-$
- High scores (Openness): More receptive to new ideas, imaginative possibilities, and engage with conceptual or unconventional perspectives.
Primary scales = $fA+$, $fI+$, $fM+$, $fQ1+$

A – Independence vs Agreeableness

- Low scores (Independence): Tend to be strong-willed, self-determining, and prepared to challenge others when necessary
Primary scales = $\beta+$, $fE+$, $fL+$, $fQ1+$
- High scores (Agreeableness): Typically tolerant, obliging, and willing to compromise, placing value on cooperation and maintaining positive interpersonal relationships.
Primary scales = $\beta-$, $fE-$, $fL-$, $fQ1-$

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 = $fG-$, $fN-$, $fQ3-$
- 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 = $fG+$, $fN+$, $fQ3+$

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, the information in this South African technical supplement refers specifically to the English version of the 15FQ+ as released by Psytech International, which is used locally. There have been no formal adaptations of the 15FQ+ released by Psytech SA. For more information about the other language versions, please contact info@psytech.co.za.

Appropriate use requires that respondents are capable of understanding 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 Grade 7 (Flesch Reading Ease score = 70.52). While this indicates that the language is generally straightforward, such indices do not account for the multilingual and differing educational context of South Africa. Furthermore, given the 15FQ+ is meant to support occupational decisions, it is recommended that respondents demonstrate a minimum English language proficiency equivalent to Grade 12 level, 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 psychology 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.

Comprehensive technical specifications for the GeneSys Online assessment platform are provided on platform and can be reviewed on <https://psytech.co.za/wp-content/uploads/2024/03/Data-protection-and-GeneSys-system-minimum-requirements.pdf>.

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 in South Africa can be found on the GeneSys platform, and are summarised in the Norm chapter of this supplement. Reports are available primarily in English, with additional languages dependent on availability through Psytech International. The 15FQ+ has four report sets, listed as follows:

15FQ+ Complete Report Set

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

15FQ+ Standard Report Set

- 15FQ+ Standard Report
- 15FQ+ Profiles Report
- 15FQ+ Ideal Profiles Report
- 15FQ+ Ideal Profiles Results 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 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. Feedback on the 15FQ+ may be provided by HPCSA-registered Psychologists, Psychometrists (Independent Practice), and Registered Counsellors.

Ethical and Professional Considerations

Use of the 15FQ+ must comply with the ethical requirements of the Health Professions Council of South Africa (HPCSA), as well as relevant legislation governing data protection and professional conduct. Practitioners are responsible for ensuring informed consent, appropriate use of results, and 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.

SOUTH AFRICAN PSYCHOMETRIC PROPERTIES

Sample Description

The South African sample used for the analyses reported in this supplement consisted of 18,191 adult respondents who completed the 15FQ+ across a range of occupational, developmental, and research contexts between January 2018 and November 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 analyses, and cases with missing biographical information were excluded only where subgroup analyses or group comparisons were required. Group categorisation followed conventions applied by established South African government agencies (Statistics South Africa, 2025). Table 5 presents the demographic composition of the final sample.

Table 5. Sample Demographics

Variable	N	%
Gender		
Female	9,168	50.4
Male	8,774	48.3
Not reported	249	1.4
Ethnicity		
Black African	5,713	31.4
White	2,756	15.1
Coloured	1,566	8.6
Indian	751	4.1
Not reported	7,405	40.7
First Language		
English	6,213	34.2
Afrikaans	2,755	15.1
isiZulu	965	5.3
isiXhosa	809	4.4
Setswana	486	2.7
Sepedi	424	2.3
Sesotho	337	1.9
Xitsonga	167	0.9
Tshivenda	155	0.9
siSwati	142	0.8
isiNdebele	39	0.2
Not reported	5,699	31.3

Education

Tertiary Diploma/Certificate	2,771	15.2
Bachelor's Degree	2,566	14.1
Bachelor Honours	1,112	6.1
Professional Qualification	1,020	5.6
Postgraduate Diploma/Certificate	937	5.2
Masters Degree	651	3.6
Doctorate	33	0.2
Not reported	9,101	50.0

Job Area

Management	3,970	21.8
Non-Managerial Professional	1,970	10.8
Technician/associate professional	533	2.9
Service/sales	468	2.6
Clerical support	440	2.4
Armed forces	227	1.2
Craft/trades	187	1.0
Plant/machine operator or assembler	108	0.6
Elementary occupations	57	0.3
Skilled agricultural, forestry, fishery	44	0.2
Not reported	10,187	56.0

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

A notable proportion of respondents did not complete biographical questions. This is not uncommon in applied assessment contexts, particularly in high-stakes environments, where individuals may experience concern about discrimination or feel vulnerable disclosing personal information. In addition, the Protection of Personal Information (POPI) Act affords respondents greater autonomy in withholding such information, and disclosure is not compulsory.

Gender representation in the sample was relatively balanced, with slightly more female (50.4%) than male (48.3%) respondents, and a small proportion not reporting gender (1.4%). While a substantial proportion of respondents did not indicate ethnicity (40.7%), among those who did report, the largest group identified as Black African (31.4%), followed by White (15.1%), Coloured (8.6%), and Indian (4.1%). Although incomplete, this distribution is broadly reflective of the diversity of the South African population. First language was also not reported by a sizeable portion of the sample (31.3%). Among those who indicated a first language, English (34.2%) was most commonly reported, followed by Afrikaans (15.1%). Among the Indigenous African languages, which cumulatively represented 19.4% of the sample, isiZulu was the most commonly reported (5.3%), followed by isiXhosa (4.4%). Given that the 15FQ+ is currently administered in English, and that several individual language

groups are too small for reliable subgroup estimation, language-based analyses compare English first language (EFL, 34.2%) and non-English first language (nEFL, 34.5%) groups, with the “not reported” group (31.3%) excluded. Where feasible, language subgroups are considered rather than solely relying on composite¹ racial categories (e.g., “Black” and “White”) as defined in the Employment Equity Act (1998), given the conceptual and cultural heterogeneity within these groups.

For additional sample descriptives, among respondents who reported educational attainment, the majority had completed a tertiary diploma/certificate or a bachelor’s degree, followed by those holding postgraduate qualifications. This profile aligns with recommended guidelines for the use of the 15FQ+, which assume that respondents have obtained at least some level of tertiary education to support reliable comprehension and interpretation of item content. The sample also represented a broad range of occupational categories. The largest groups were employed in management roles (21.8%) and professional occupations (10.8%), with additional representation across clerical support, service and sales, technical, craft and trades, and armed forces occupations. This diversity supports the applicability of the 15FQ+ across varied organisational and work contexts within South Africa.

Group Mean Comparisons

Prior to conducting group mean comparisons on the gender (female/male), ethnic (Black – including Indian and Coloured/White), 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).

¹ The South African Employment Equity Act, 1998 (chapter 1[35]) use the term ‘black people’ as a generic term which means African-, Coloured-, Indian- and Asian people (Republic of South Africa, 1998).

Mean differences across gender groups

Table 6. Gender group mean differences

Scale	Female (n = 9 168)		Male (n = 8 774)		<i>t</i>	<i>df</i>	<i>d</i>
	Mean	SD	Mean	SD			
<i>fA</i>	20.33	2.82	18.93	3.39	29.99*	17 076	.45
<i>fB</i>	20.44	3.71	20.99	3.44	-10.34*	17 922	-.15
<i>fC</i>	17.18	4.85	18.34	4.44	-16.85*	17 902	-.25
<i>fE</i>	14.24	4.29	15.32	4.13	-17.24*	17 940	-.26
<i>fF</i>	14.05	5.14	13.67	5.39	4.75*	17 789	.07
<i>fG</i>	20.79	3.73	20.64	3.76	2.63	17 894	.04
<i>fH</i>	14.60	6.07	15.34	5.92	-8.23*	17 933	-.12
<i>fI</i>	17.40	4.01	12.51	4.60	75.82*	17 371	1.13
<i>fL</i>	9.39	4.83	9.09	4.87	4.12*	17 891	.06
<i>fM</i>	9.84	3.84	10.15	3.82	-5.33*	17 913	-.08
<i>fN</i>	20.18	3.51	20.00	3.65	3.41*	17 814	.05
<i>fO</i>	13.00	5.79	12.26	5.56	8.70*	17 940	.13
<i>fQ1</i>	8.50	4.42	8.17	4.44	5.01*	17 898	.07
<i>fQ2</i>	9.04	5.13	8.36	5.05	8.87*	17 926	.13
<i>fQ3</i>	21.02	2.86	21.30	2.57	-7.12*	17 876	-.11
<i>fQ4</i>	7.29	5.00	7.01	4.89	3.88*	17 932	.06

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

While many of the t -tests reported in Table 6 yielded statistically significant differences between females and males due to the large sample size, practical differences were substantial only for Empathic (fA ; $d = 0.45$, medium effect) and Tender-minded (fI ; $d = 1.13$, very large effect), which may be reflective of gender-related societal expectations to show empathic concern and interpersonal sensitivity. The other differences, although statistically significant, were small in magnitude ($d < 0.2$) and likely reflect the sensitivity of the tests to large sample sizes rather than meaningful gender differences.

Importantly, examination of the raw score distributions and standard errors (SEMs) suggests that these effects are consistent at the individual score level. However, once scores are transformed into normed or standardised scores, small differences are likely to be "evened out," further highlighting that only Empathic and Tender-minded represent gender differences of practical significance.

Mean differences across ethnic groups

Table 7. Ethnic group mean differences

Scale	Black (n = 8 030)		White (n = 2 756)		t	df	d
	Mean	SD	Mean	SD			
fA	19.87	2.93	19.25	3.79	7.91*	3 947	0.19
fB	20.83	3.49	20.68	3.83	1.87	4 421	0.04
fC	17.89	4.53	17.74	5.03	1.43	4 390	0.03
fE	14.80	4.11	14.87	4.72	-0.74	4 275	-0.02
fF	13.73	5.20	14.62	5.41	-7.52*	4 621	-0.17
fG	20.91	3.56	20.12	4.33	8.56*	4 108	0.20
fH	15.46	5.83	14.11	6.39	9.79*	4 433	0.22
fI	15.29	4.83	14.37	5.20	8.12*	4 491	0.18
fL	9.27	4.84	8.38	4.87	8.30*	4 756	0.18
fM	10.10	3.62	9.63	4.36	5.11*	4 135	0.12
fN	20.45	3.25	19.18	4.39	13.85*	3 843	0.33
fO	12.13	5.53	13.55	6.00	-10.88*	4 466	-0.24
fQ1	8.58	4.37	7.93	4.82	6.26*	4 410	0.14
fQ2	8.74	4.96	8.37	5.40	3.21*	4 454	0.07
fQ3	21.05	2.69	21.24	2.97	-2.93*	4 407	-0.07
fQ4	6.59	4.55	8.61	5.62	-17.03*	4 063	-0.39

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

As mentioned earlier, in this and subsequent analyses, Black refers to the combined African Black, Indian, and Coloured samples. The results reported in Table 7 indicate that although several t -tests flagged as statistically significant, most effect sizes are small ($d < 0.25$), suggesting limited practical differences. The largest differences were observed for Restrained (fN ; $d = 0.33$), with Black respondents scoring higher, and Tense-driven ($fQ4$; $d = -0.39$), with White respondents scoring higher. For the majority of scales, differences are modest and unlikely to be meaningful at the individual level.

Mean differences across language groups

Table 8. Language group mean differences

Scale	EFL (n = 6 213)		nEFL (n = 6 279)		t	df	d
	Mean	SD	Mean	SD			
fA	19.95	3.09	19.50	3.25	7.88*	12 468	0.14
β	21.11	3.45	20.50	3.68	9.50*	12 457	0.17
fC	17.89	4.70	17.62	4.74	3.23*	12 490	0.06
fE	14.73	4.24	14.75	4.30	-0.18	12 490	0.00
fF	14.32	5.13	13.68	5.32	6.84*	12 482	0.12
fG	20.92	3.66	20.57	3.83	5.16*	12 474	0.09
fH	15.42	5.93	14.67	6.10	6.94*	12 486	0.12
fI	15.31	4.93	14.86	4.90	5.16*	12 486	0.09
fL	8.81	4.92	9.42	4.77	-7.04*	12 470	-0.13
fM	10.09	3.90	9.89	3.79	2.88*	12 471	0.05
fN	20.12	3.64	20.11	3.60	0.16	12 483	0.00
fO	12.42	5.78	12.86	5.64	-4.33*	12 476	-0.08
fQ1	8.43	4.58	8.31	4.34	1.41	12 439	0.03
fQ2	8.61	4.98	8.73	5.16	-1.29	12 482	-0.02
fQ3	20.83	2.97	21.36	2.52	-10.76*	12 120	-0.19
fQ4	6.86	4.93	7.42	4.98	-6.33*	12 490	-0.11

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

As mentioned earlier, in this and subsequent analyses, non-English first language refers to all samples that indicated any other nationally recognised South African language other than English, and this differentiation is based on the 15FQ+ currently only being available in South Africa in English.

Overall, the language group differences reported in Table 8 are modest and unlikely to have meaningful implications at the individual level, however further analyses will determine the implications of these differences on test fairness and norm availability. While several scales had statistically significant mean differences, effect sizes are generally small ($d < 0.20$), indicating limited practical differences. Notable small effects favouring English first language respondents were found for Intellectance (β ; $d = 0.17$), Empathic (fA ; $d = 0.14$), and Socially-bold (fH ; $d = 0.12$), while small effects favouring non-English first language respondents were observed for Suspicious (fL ; $d = -0.13$), Self-disciplined ($fQ3$; $d = -0.19$), and Tense-driven ($fQ4$; $d = -0.11$).

Overall, while some differences are evident across the subgroups, particularly for gender and ethnicity, most scales show minimal practical impact. Subsequent analyses will evaluate whether any observed differences have implications for test fairness, norming, or potential adverse impact.

Internal Consistency Reliability

Internal consistency reliability estimates for the overall South African sample and gender, ethnic (as defined by the Employment Equity Act), and language (English first language vs not-English first language) subgroups are presented in Table 6. Cronbach's alpha (α) and McDonald's omega (ω) are reported for completeness; however, interpretation prioritises ω due to its robustness under violations of tau-equivalence and its suitability for multidimensional personality constructs (Dunn et al., 2014). The assumption of tau-equivalence, required for coefficient alpha, is rarely met in applied personality measurement, where item loadings are typically heterogeneous. In contrast, omega provides a more accurate estimate of internal consistency under realistic measurement conditions and is therefore recommended for scale reliability estimation (Cortina et al., 2020; Hayes & Coutts, 2020). Standard Error of Measurement (SEM) reflects the expected dispersion of an observed score around an individual's true score due to measurement error (Musselwhite & Wesolowski, 2018).

Table 9. Internal consistency reliability estimates for the 15FQ+ primary scales

Scale	Females (n = 9 168)		Males (n = 8 774)		Black (n = 8 030)		White (n = 2 756)		EFL (n = 6 213)		nEFL (n = 6 279)		Overall Sample (n = 18 191)			
	α	ω	α	ω	α	ω	α	ω	α	ω	α	ω	α	ω	SD	SEM
fA	.53	.63	.59	.66	.54	.61	.69	.73	.58	.66	.59	.66	.58	.66	3.18	1.86
fB	.68	.69	.68	.69	.67	.69	.73	.73	.69	.70	.68	.70	.68	.69	3.58	1.99
fC	.77	.78	.74	.75	.75	.76	.80	.81	.77	.78	.76	.78	.76	.77	4.69	2.23
fE	.65	.65	.63	.63	.63	.64	.72	.72	.66	.66	.66	.66	.65	.65	4.24	2.52
fF	.73	.74	.74	.74	.73	.73	.76	.76	.73	.73	.74	.74	.74	.74	5.27	2.69
fG	.71	.73	.70	.72	.69	.71	.76	.76	.70	.72	.71	.73	.70	.72	3.74	1.97
fH	.81	.81	.80	.80	.79	.80	.83	.83	.80	.81	.81	.81	.80	.81	6.01	2.64
fI	.55	.56	.63	.63	.66	.66	.73	.72	.69	.68	.67	.67	.68	.68	4.95	2.81
fL	.70	.69	.70	.70	.70	.69	.71	.71	.71	.71	.69	.68	.70	.69	4.85	2.69
fM	.54	.55	.55	.56	.51	.49	.64	.66	.57	.58	.53	.54	.55	.55	3.82	2.56
fN	.63	.67	.65	.69	.59	.65	.72	.73	.65	.70	.64	.68	.64	.68	3.58	2.02
fO	.76	.76	.72	.73	.72	.73	.78	.78	.75	.76	.74	.74	.74	.75	5.69	2.87
fQ1	.60	.62	.60	.62	.59	.60	.68	.69	.63	.65	.58	.60	.60	.62	4.43	2.73
fQ2	.73	.73	.73	.73	.72	.72	.76	.76	.72	.72	.73	.73	.73	.73	5.10	2.66
fQ3	.56	.62	.49	.57	.51	.59	.61	.67	.57	.63	.48	.57	.53	.60	2.73	1.72
fQ4	.71	.73	.71	.72	.66	.68	.78	.79	.72	.73	.71	.72	.71	.72	4.94	2.61
SD	.66	.66	.64	.65	.64	.65	.64	.64	.66	.67	.64	.65	.65	.65	3.22	1.90
Median coefficient	.69	.69	.69	.70	.67	.68	.73	.73	.70	.70	.68	.69	.69	.69		

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

Table 9 reflects SEM values calculated using Cronbach's alpha coefficients and are expressed in raw-score units. For transparency regarding score reporting conventions, SEM

is presented differently in operational assessment outputs. In Psytech-generated reports, SEM is displayed graphically as an error band around the reported sten score. This reflects the standardised reporting format in practitioner outputs and does not affect the underlying measurement precision in raw-score units.

Across the overall sample, omega coefficients ranged from 0.55 to 0.81, with a median ω (excluding SD) of 0.69. The scales Socially-bold (*fH*), Emotionally Stable (*fC*), and Self-Doubt (*fO*) demonstrated the strongest internal consistency, while lower coefficients were observed for Abstract (*fM*) and Self-Discipline (*fQ3*). These patterns are consistent with international 15FQ+ findings and reflect differences in construct breadth and item heterogeneity rather than measurement deficiency.

Reliability estimates were highly consistent across gender groups, indicating stable measurement properties for males and females. Ethnic and language-based comparisons showed modestly higher reliability coefficients in the White and English first-language groups, a pattern commonly observed in English-administered instruments and likely attributable to differences in language proficiency and educational background rather than construct bias.

In evaluating measurement precision, SEM values were considered alongside internal consistency coefficients and observed score variability (SD). Scales with SEM values noticeably larger than those observed for scales demonstrating acceptable reliability ($\omega \geq .70$) were flagged as having comparatively reduced measurement precision. This threshold was applied conservatively and is intended to support contextual interpretation of reliability estimates rather than to function as a strict decision rule.

Overall, the results indicate that the 15FQ+ primary scales demonstrate acceptable and stable internal consistency across major demographic groups within the South African context, supporting their use for both research and applied assessment purposes when interpreted with appropriate contextual awareness.

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, as measured by the GRT2. These coefficients are reported in Table 10.

Table 10. Internal Consistency of the 15FQ+ Across Verbal Reasoning Stanines

	GRT2 stanine								
	1	2	3	4	5	6	7	8	9
	(n=251)	(n=699)	(n=2111)	(n=3665)	(n=4445)	(n=4138)	(n=3096)	(n=1960)	(n=1391)
fA	.62	.47	.54	.60	.66	.67	.74	.73	.78
fB	.66	.65	.66	.68	.69	.70	.70	.70	.70
fC	.77	.72	.75	.76	.78	.79	.79	.80	.79
fE	.56	.47	.56	.57	.61	.67	.68	.71	.71
fF	.72	.70	.71	.72	.74	.75	.75	.76	.78
fG	.62	.59	.59	.67	.72	.72	.75	.76	.79
fH	.76	.75	.75	.78	.79	.81	.82	.83	.84
fI	.54	.59	.61	.65	.66	.69	.70	.69	.71
fL	.63	.58	.59	.64	.67	.69	.72	.73	.76
fM	.52	.40	.50	.46	.46	.56	.62	.66	.70
fN	.76	.60	.65	.64	.66	.70	.73	.71	.74
fO	.66	.68	.67	.69	.72	.76	.78	.80	.80
fQ1	.42	.43	.42	.41	.55	.62	.67	.72	.76
fQ2	.71	.65	.67	.68	.72	.73	.74	.75	.79
fQ3	.70	.40	.39	.45	.49	.56	.60	.65	.72
fQ4	.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 $\omega = .65$ at Stanine 1 to $\omega = .77$ 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 is inherently influenced by the length of the retest interval, particularly for normal-range personality instruments such as the 15FQ+, which are grounded in trait theory but are also sensitive to contextual influences and developmental change (McCrae et al., 2011). Retest reliability was therefore examined at two broad intervals to evaluate both temporal measurement stability (short) and enduring trait variance (long) for the 15FQ+ primary scales, and is presented in Table 11.

Table 11. Test-retest reliability of the 15FQ+ primary scales

	Short (2-4 weeks) n = 262	Long (6-12 months) n = 119
fA	.72	.50
fB	.73	.55
fC	.79	.56
fE	.81	.51
fF	.83	.60
fG	.79	.53
fH	.84	.61
fI	.83	.66
fL	.70	.62
fM	.69	.57
fN	.62	.51
fO	.69	.54
fQ1	.69	.51
fQ2	.80	.53
fQ3	.73	.54
fQ4	.77	.55
SD	.73	.54
Median	.75	.55

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

Short-term retest correlations were calculated from data from 262 respondents who re-completed the 15FQ+ within a 2–4 week interval. Coefficients were strong across all scales, with a median value of .75, indicating high temporal stability over brief periods where it can be assumed that personality could not have meaningfully changed. Long-term retest correlations were calculated from data from 119 respondents who re-completed the 15FQ+ within a 6-12 month interval. Correlations were more moderate (median $r = .55$), consistent with theoretical expectations that personality traits demonstrate rank-order stability alongside meaningful intra-individual change, due to role demands, life events, and/or learning, over extended periods (Terracciano et al., 2010).

The pattern of higher short-term and attenuated long-term stability closely mirrors findings reported in the international 15FQ+ manual and comparable personality instruments, supporting the temporal reliability of the 15FQ+ under operational assessment conditions.

Equivalence Reliability

To evaluate reliability equivalence between the standard (Form A) and shortened (Form C) forms, correlations were computed for the primary scales using a sample of 2065 respondents. Table 12 presents the uncorrected correlations between the Standard (Form A) and Short (Form C) versions of the 15FQ+, which may be interpreted as estimates of alternate-form reliability. Observed correlations between Form A and Form C ranged from .76 to .93 across the primary factors.

Table 12. Uncorrected correlations between 15FQ+ Form A and Form C

Scale	Correlation (uncorrected)
fA	.84
fB	.81
fC	.93
fE	.86
fF	.86
fG	.90
fH	.91
fI	.90
fL	.91
fM	.81
fN	.81
fO	.90
fQ1	.76
fQ2	.90
fQ3	.78
fQ4	.87

Because all items included in Form C are drawn from Form A, uncorrected correlations between the two forms are expected to be elevated due to shared item content and may therefore be regarded as upper-bound estimates of the association between the forms. Attenuation-corrected correlations (Levy, 1967), based on McDonald's omega coefficients for each form, were also computed to provide estimates of the underlying true-score relationship between the forms. However, across all 16 scales, corrected correlations exceeded unity

(i.e., correlations greater than 1.0), reflecting very high observed correlations in combination with modest internal consistency estimates for each Form. In accordance with classical test theory conventions, these results were interpreted as indicating that true-score correlations approach 1.00. For this reason, only uncorrected coefficients are reported in Table 12.

Overall, the findings indicate strong alternate-form equivalence between Forms A and C.

While Form C demonstrates slightly lower internal consistency coefficients in the South African population and therefore tends to be used less often, the above findings suggest that Form C may be regarded as a psychometrically comparable short form suitable for screening and high-throughput assessment contexts, especially when used alongside other assessments to support decision-making, while Form A remains preferable for comprehensive individual assessment.

Structural Validity

Given that the 15FQ+ is a well-established internationally developed instrument with a clearly specified theoretical and empirical factor structure, and that no item content or scale structure was modified for the South African context, exploratory factor analysis was not undertaken at scale level for this local validation. However, before evaluating structural equivalence across demographic and language subgroups using confirmatory factor analysis, an exploratory factor analysis (EFA) was conducted to examine whether the higher-order personality structure underlying the 15FQ+ could be reasonably recovered in the South African sample. This analysis served to assess the dimensional plausibility of the global structure in the local context and to ensure that subsequent CFA-based evaluations of model fit and subgroup comparability were conducted on a structurally appropriate foundation.

Inter-factor Correlations

Inter-factor associations among the primary 15FQ+ scales were examined using correlations between scale scores. These correlations are presented in Table 13. 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.

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 (*fC*) showed moderate negative associations with Self-doubting (*fO*) and Tense-driven (*fQ4*), consistent with their shared alignment with the anxiety global factor. Similarly, Enthusiastic (*fF*), Socially-bold (*fH*), and Self-sufficient (*fQ2*) demonstrated moderate intercorrelations, reflecting their common contribution to the higher-order Extraversion global factor.

Table 13. Inter-Factor Correlations of the 15FQ+ Primary Factors

	<i>fA</i>	<i>fB</i>	<i>fC</i>	<i>fE</i>	<i>fF</i>	<i>fG</i>	<i>fH</i>	<i>fI</i>	<i>fL</i>	<i>fM</i>	<i>fN</i>	<i>fO</i>	<i>fQ1</i>	<i>fQ2</i>	<i>fQ3</i>
<i>fA</i>	—														
<i>fB</i>	.19*	—													
<i>fC</i>	.11*	.33*	—												
<i>fE</i>	.03*	.30*	.22*	—											
<i>fF</i>	.30*	.16*	.13*	.17*	—										
<i>fG</i>	.12*	.24*	.25*	.13*	-.07*	—									
<i>fH</i>	.27*	.34*	.36*	.46*	.46*	.10*	—								
<i>fI</i>	.32*	.01	-.04*	-.12*	.04*	.06*	.05*	—							
<i>fL</i>	-.21*	-.24*	-.33*	-.04*	-.19*	-.03*	-.19*	-.09*	—						
<i>fM</i>	.16*	.09*	-.19*	.06*	.16*	-.16*	.14*	.20*	-.02*	—					
<i>fN</i>	.17*	.10*	.25*	-.17*	-.10*	.30*	-.03*	.10*	-.11*	-.17*	—				
<i>fO</i>	-.02*	-.26*	-.56*	-.25*	-.12*	-.10*	-.37*	.05*	.24*	.15*	-.07*	—			
<i>fQ1</i>	-.01	.04*	-.11*	.14*	.12*	-.28*	.15*	.06*	.02*	.34*	-.32*	-.04*	—		
<i>fQ2</i>	-.23*	-.11*	-.23*	-.17*	-.50*	.00	-.43*	.01	.26*	-.01	-.06*	.16*	.02*	—	
<i>fQ3</i>	.04*	.00	.06*	.03*	-.04*	.26*	.01	-.07*	.13*	-.17*	.22*	.05*	-.35*	-.04*	—
<i>fQ4</i>	-.18*	-.22*	-.52*	.06*	-.06*	-.19*	-.18*	-.06*	.24*	.11*	-.37*	.41*	.12*	.16*	-.06*

Note. * Statistically significant at the .05 level

Exploratory Examination of the Higher-Order Factor Structure

An exploratory factor analysis was conducted using maximum likelihood extraction with an oblimin rotation. This rotation was selected in line with both theoretical expectations and empirical evidence that the primary personality factors are related but not redundant. This approach is consistent with the intended hierarchical structure of the 15FQ+, in which primary factors contribute to broader global dimensions. Factors presented in Table 14 are in an order that maximises conceptual correspondence between the international and South

African solutions. Factor labels are indicative rather than definitive. Differences in the sign of loadings reflect factor polarity and are consistent with the indeterminacy of factor orientation in oblique solutions.

The South African exploratory factor analysis yielded a five-factor solution, consistent with the international higher-order structure of the 15FQ+. The extracted factors demonstrated clear conceptual alignment with the international solution, particularly for the dimensions reflecting Extraversion (fF, fH, fQ2) as reflected by Factor 1 in the international model and Factor 2 in the SA model, Anxiety (fC, fO, fQ4), as reflected by Factor 2 in the international model and Factor 1 in the SA model, Openness (fM, fQ1) as reflected as Factor 3 in both models, Agreeableness (β , fE) reflected in Factor 4 in both models, and Self-Control (fG, fN, fQ3) as reflected by Factor 5 in the international model and Factor 3 in the SA model.

Table 14. Exploratory Factor Analysis Comparison: International vs South Africa

Scales	INTERNATIONAL					SOUTH AFRICA				
	F1	F2	F3	F4	F5	F1	F2	F3	F4	F5
<i>fA</i>	.61	-	-	.31	-	-	-	-	-	.55
β	-	-	-	.48	-	-	-	-	.35	-
<i>fC</i>	-	.76	-	-	-	-.76	-	-	-	-
<i>fE</i>	.40	-	-	.68	-	-	-	-	.74	-
<i>fF</i>	.82	-	-	-	-	-	.70	-	-	-
<i>fG</i>	-	-	-	-	.75	-	-	.50	-	-
<i>fH</i>	.63	-	-	.42	-	-	.41	-	.43	-
<i>fI</i>	-	-	.63	-	-	-	-	-	-	.52
<i>fL</i>	-	-.38	-	-	-	.37	-	-	-	-
<i>fM</i>	-	-	.51	-	-.36	-	-	-.38	-	.39
<i>fN</i>	-	-	-	-.39	.50	-	-	.43	-	-
<i>fO</i>	-	-.61	-	-.4	-	.71	-	-	-	-
<i>fQ1</i>	-	-	.45	-	-	-	-	-.66	-	-
<i>fQ2</i>	-.71	-	-	-	-	-	-.73	-	-	-
<i>fQ3</i>	-	-	-	-	.65	-	-	.58	-	-
<i>fQ4</i>	-	.71	-	-	-	.68	-	-	-	-

Note. 'Maximum likelihood' extraction method was used in combination with an 'oblimin' rotation

Although some primary scales exhibited secondary loadings, these patterns closely mirrored those observed in the international EFA and are consistent with the theoretically expected interrelatedness of personality traits. For the South African model specifically, overall model fit indices (RMSEA = .052; TLI = .914), variance explained (44.7%), and inter-factor correlations support the structural comparability of the local solution with the international model, providing preliminary evidence for cross-cultural configural similarity at the global factor level.

Structural Equivalence across Demographics

Building on the exploratory factor analysis, which supported use of the internationally established higher-order structure of the 15FQ+ in the South African context, confirmatory factor analyses (CFAs) were subsequently conducted to rigorously test the fit of the hypothesised factor structure and to evaluate structural equivalence 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 reasonable 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 = 18,191)	1992.04	54	.90	.88	.04	.03
Female (n = 9,168)	522.81	108	.90	.88	.04	.03
Male (n = 8,774)	729.49	108	.90	.88	.04	.03
Black (n = 8,030)	604.38	108	.89	.87	.04	.03
White (n = 2,756)	268.41	108	.90	.87	.04	.03
Non-English (n = 6,279)	477.92	108	.90	.88	.04	.03
English (n = 6,213)	488.90	108	.90	.88	.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 Empathic (fA) CFAs demonstrated in Table 15 show acceptable model fit, with CFI and TLI values at or near 0.90, RMSEA values below 0.05, and low SRMR values below 0.05, indicating good residual fit. Comparable patterns of model fit were observed across demographic groups, with only minor variation in fit indices. These findings provide evidence that the intended factor structure of the Empathic scale is consistently replicated across groups, supporting structural equivalence.

Intellectance (β).

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

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 18,191)	7572.62	54	.69	.62	.09	.07
Female (n = 9,168)	2558.07	108	.69	.62	.09	.06
Male (n = 8,774)	2157.70	108	.69	.62	.09	.06
Black (n = 8,030)	1923.92	108	.70	.63	.09	.06
White (n = 2,756)	932.11	108	.70	.64	.09	.06
Non-English (n = 6,279)	1625.50	108	.69	.62	.09	.06
English (n = 6,213)	1766.26	108	.69	.62	.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.

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 was highly stable across demographic subgroups, suggesting that the same underlying factor structure is being estimated in each group.

Emotionally Stable (fC).

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

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 18,191)	3715.97	54	.89	.86	.06	.04
Female (n = 9,168)	1448.56	108	.88	.86	.06	.04
Male (n = 8,774)	1599.94	108	.89	.86	.06	.04
Black (n = 8,030)	1250.64	108	.90	.87	.06	.04
White (n = 2,756)	453.17	108	.90	.88	.06	.04
Non-English (n = 6,279)	1165.64	108	.89	.87	.06	.04
English (n = 6,213)	945.75	108	.89	.87	.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, with RMSEA values suggesting moderate fit and SRMR values indicating good residual fit. CFI and TLI values approached acceptable levels and were highly consistent across gender, ethnic, and language groups. The replication of fit patterns across groups supports the conclusion that the intended factor structure of Emotional Stability is stable and structurally equivalent across demographic groups.

Dominant (fE).

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

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 18,191)	3045.78	54	.82	.78	.06	.04
Female (n = 9,168)	1365.69	108	.82	.77	.06	.04
Male (n = 8,774)	1564.28	108	.82	.77	.06	.04
Black (n = 8,030)	1056.64	108	.85	.82	.05	.04
White (n = 2,756)	525.95	108	.85	.82	.05	.04
Non-English (n = 6,279)	1080.96	108	.83	.79	.05	.04
English (n = 6,213)	940.78	108	.83	.79	.05	.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. This consistency suggests that, while overall fit is modest, the same factor structure is replicated across groups, providing evidence of structural equivalence.

Enthusiastic (fF).

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

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 18,191)	8496.10	54	.74	.68	.09	.07
Female (n = 9,168)	4032.75	108	.74	.68	.09	.06
Male (n = 8,774)	4115.03	108	.74	.68	.09	.06
Black (n = 8,030)	3586.34	108	.74	.69	.09	.06
White (n = 2,756)	1357.04	108	.74	.69	.09	.06
Non-English (n = 6,279)	2969.86	108	.73	.67	.09	.06
English (n = 6,213)	2857.90	108	.73	.67	.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 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. Importantly, 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 = 18,191)	1801.03	54	.93	.91	.04	.03
Female (n = 9,168)	673.74	108	.93	.91	.04	.03
Male (n = 8,774)	485.88	108	.93	.91	.04	.03
Black (n = 8,030)	489.52	108	.93	.91	.04	.03
White (n = 2,756)	261.45	108	.93	.91	.04	.03
Non-English (n = 6,279)	396.42	108	.92	.90	.04	.03
English (n = 6,213)	502.01	108	.93	.91	.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 CFAs for Conscientious (fG), shown in Table 20, demonstrated good model fit across all demographic groups, with CFI and TLI values exceeding 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 = 18,191)	5931.67	54	.87	.84	.08	.05
Female (n = 9,168)	2748.94	108	.87	.84	.08	.05
Male (n = 8,774)	2561.95	108	.87	.84	.08	.05
Black (n = 8,030)	2269.57	108	.87	.84	.08	.05
White (n = 2,756)	913.32	108	.87	.84	.08	.05
Non-English (n = 6,279)	1875.26	108	.87	.84	.08	.05
English (n = 6,213)	1852.37	108	.87	.84	.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.

As reported in Table 21, the Socially-Bold (fH) CFAs yielded acceptable model fit, with RMSEA and SRMR values within 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 (fl).

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

	χ^2	df	CFI	TLI	RMSEA	SRMR
Overall (n = 18,191)	7558.63	54	.69	.61	.09	.06
Female (n = 9,168)	2953.87	108	.67	.60	.07	.05
Male (n = 8,774)	2266.71	108	.67	.60	.07	.05
Black (n = 8,030)	3385.13	108	.69	.62	.09	.06
White (n = 2,756)	1018.53	108	.69	.62	.09	.06
Non-English (n = 6,279)	2615.45	108	.68	.61	.09	.06
English (n = 6,213)	2493.97	108	.68	.61	.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.

The CFA results for Tender-minded (fl), 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 = 18,191)	6902.12	54	.73	.67	.08	.06
Female (n = 9,168)	3095.09	108	.73	.67	.08	.06
Male (n = 8,774)	3407.75	108	.73	.67	.08	.06
Black (n = 8,030)	3015.51	108	.72	.66	.09	.06
White (n = 2,756)	1010.75	108	.72	.66	.09	.06
Non-English (n = 6,279)	2202.53	108	.73	.67	.08	.06
English (n = 6,213)	2337.87	108	.73	.67	.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.

Table 23 summarises the CFA results for Suspicious (fL), which indicate acceptable residual fit (SRMR) and borderline 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 = 18,191)	5929.25	54	.58	.49	.08	.06
Female (n = 9,168)	2928.50	108	.58	.48	.08	.06
Male (n = 8,774)	3146.44	108	.58	.48	.08	.06
Black (n = 8,030)	2027.68	108	.64	.56	.07	.06
White (n = 2,756)	981.70	108	.64	.56	.07	.06
Non-English (n = 6,279)	1935.88	108	.60	.52	.08	.06
English (n = 6,213)	1921.95	108	.60	.52	.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 = 18,191)	4917.49	54	.78	.73	.07	.05
Female (n = 9,168)	1712.72	108	.78	.73	.07	.05
Male (n = 8,774)	1509.56	108	.78	.73	.07	.05
Black (n = 8,030)	1306.65	108	.76	.71	.07	.05
White (n = 2,756)	769.16	108	.76	.71	.07	.05
Non-English (n = 6,279)	999.39	108	.78	.73	.07	.05
English (n = 6,213)	1294.41	108	.78	.74	.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 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 = 18,191)	2220.15	54	.92	.91	.05	.03
Female (n = 9,168)	1174.42	108	.92	.90	.05	.03
Male (n = 8,774)	1040.12	108	.92	.91	.05	.03
Black (n = 8,030)	974.83	108	.92	.90	.05	.03
White (n = 2,756)	390.95	108	.92	.90	.05	.03
Non-English (n = 6,279)	801.97	108	.92	.91	.05	.03
English (n = 6,213)	730.87	108	.92	.91	.05	.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 = 18,191)	6705.47	54	.64	.56	.08	.07
Female (n = 9,168)	3137.24	108	.64	.56	.08	.06
Male (n = 8,774)	3297.52	108	.64	.56	.08	.06
Black (n = 8,030)	2563.96	108	.66	.58	.08	.06
White (n = 2,756)	1283.23	108	.66	.58	.08	.06
Non-English (n = 6,279)	2216.65	108	.64	.56	.08	.06
English (n = 6,213)	2361.69	108	.64	.56	.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.

Table 27 presents the CFA results for Radical (fQ1), which indicate modest overall model fit, with acceptable RMSEA and SRMR values but 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 = 18,191)	4126.08	54	.86	.82	.06	.05
Female (n = 9,168)	2155.35	108	.86	.83	.06	.04
Male (n = 8,774)	1709.58	108	.86	.83	.06	.04
Black (n = 8,030)	1574.17	108	.87	.84	.06	.04
White (n = 2,756)	624.64	108	.87	.84	.06	.04
Non-English (n = 6,279)	1397.67	108	.86	.83	.06	.04
English (n = 6,213)	1274.17	108	.86	.83	.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 28, the CFAs for Self-Sufficient (fQ2) demonstrated acceptable model fit, with RMSEA and SRMR values within 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 = 18,191)	2853.43	54	.79	.74	.05	.04
Female (n = 9,168)	923.18	108	.78	.73	.05	.04
Male (n = 8,774)	759.20	108	.79	.74	.05	.04
Black (n = 8,030)	678.70	108	.80	.75	.05	.04
White (n = 2,756)	349.90	108	.80	.76	.05	.04
Non-English (n = 6,279)	493.33	108	.79	.74	.05	.04
English (n = 6,213)	692.68	108	.80	.75	.05	.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 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 = 18,191)	2199.50	54	.90	.88	.05	.03
Female (n = 9,168)	902.21	108	.90	.88	.05	.03
Male (n = 8,774)	1156.60	108	.90	.88	.05	.03
Black (n = 8,030)	799.56	108	.91	.89	.05	.03
White (n = 2,756)	361.25	108	.91	.89	.05	.03
Non-English (n = 6,279)	677.95	108	.91	.89	.05	.03
English (n = 6,213)	639.76	108	.91	.90	.05	.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.

Table 30 summarises the CFA results for Tense-Driven (fQ4), which show acceptable to good model fit, with CFI values at or above 0.90, low RMSEA values, and very low 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 6. 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 equivalence of individual primary scales, 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 South African 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.

Table 31. Global Factor CFA Model Fit across Demographic Groups

Global Factor	Sample	χ^2	CFI	TLI	RMSEA	SRMR
Extraversion	Overall (n = 18,191)	46492,91	0,72	0,71	0,05	0,05
	Female (n = 9,168)	21390,28	0,72	0,71	0,05	0,05
	Male (n = 8,774)	21328,90	0,72	0,71	0,05	0,05
	Black (n = 8,030)	18267,85	0,73	0,71	0,05	0,05
	White (n = 2,756)	7733,90	0,73	0,71	0,05	0,05
	Non-English (n = 6,279)	15805,51	0,72	0,70	0,05	0,05
	English (n = 6,213)	14775,30	0,72	0,71	0,05	0,05
Anxiety	Overall (n = 18,191)	28786,89	0,80	0,79	0,04	0,04
	Female (n = 9,168)	13710,85	0,80	0,78	0,04	0,04
	Male (n = 8,774)	14379,00	0,80	0,79	0,04	0,04
	Black (n = 8,030)	12257,42	0,80	0,79	0,04	0,04
	White (n = 2,756)	4890,65	0,80	0,79	0,04	0,04
	Non-English (n = 6,279)	10242,74	0,80	0,79	0,04	0,04
	English (n = 6,213)	9674,06	0,80	0,79	0,04	0,04
Pragmatism	Overall (n = 18,191)	43443,33	0,58	0,55	0,05	0,05
	Female (n = 9,168)	18124,20	0,58	0,55	0,04	0,05
	Male (n = 8,774)	19006,94	0,58	0,56	0,04	0,05
	Black (n = 8,030)	17301,09	0,59	0,57	0,05	0,05
	White (n = 2,756)	7189,50	0,59	0,57	0,05	0,05
	Non-English (n = 6,279)	14679,20	0,58	0,56	0,05	0,05
	English (n = 6,213)	14184,10	0,58	0,56	0,05	0,05
Independence	Overall (n = 18,191)	38244,62	0,63	0,61	0,04	0,05
	Female (n = 9,168)	18388,19	0,63	0,61	0,04	0,05
	Male (n = 8,774)	17855,95	0,63	0,61	0,04	0,05
	Black (n = 8,030)	15509,55	0,64	0,63	0,04	0,05
	White (n = 2,756)	6754,57	0,65	0,63	0,04	0,05
	Non-English (n = 6,279)	12749,02	0,63	0,62	0,04	0,05
	English (n = 6,213)	13369,84	0,63	0,61	0,04	0,05
Self-Control	Overall (n = 18,191)	16540,03	0,77	0,76	0,04	0,04
	Female (n = 9,168)	6413,37	0,77	0,75	0,04	0,04
	Male (n = 8,774)	5610,74	0,77	0,76	0,04	0,04
	Black (n = 8,030)	5146,17	0,77	0,75	0,04	0,04
	White (n = 2,756)	2621,70	0,77	0,76	0,04	0,04
	Non-English (n = 6,279)	4071,49	0,77	0,76	0,04	0,04
	English (n = 6,213)	4745,69	0,77	0,75	0,04	0,04

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.

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 South African 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 generally meeting recommended guidelines 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 South African 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.

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 32. Empathic (fA) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fA1	-0.20	0.14	0.95	0.74
fA2	2.51	0.05	1.20	1.39
fA3	-0.99	0.06	1.01	1.03
fA4	-0.95	0.14	0.99	0.96
fA5	1.15	0.07	1.05	1.07
fA6	0.92	0.06	0.93	0.89
fA7	-2.10	0.10	0.98	0.93
fA8	0.13	0.11	0.92	0.61
fA9	1.91	0.05	1.04	1.08
fA10	0.37	0.13	1.01	1.16
fA11	0.03	0.09	0.90	0.69
fA12	1.17	0.06	1.06	1.09

Item fit indices for Intellectance (β)*Table 33. Intellectance (β) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
β1	-0.06	0.07	1.00	1.05
β2	-0.41	0.08	1.03	1.21
β3	1.54	0.05	1.04	1.02
β4	-0.76	0.08	0.98	1.07
β5	1.46	0.06	1.06	1.11
β6	0.70	0.08	1.10	1.52
β7	0.78	0.08	0.97	0.84
β8	-0.62	0.11	1.00	1.04
β9	0.02	0.09	1.02	0.97
β10	-0.02	0.07	1.00	1.09
β11	1.49	0.06	1.01	0.95
β12	0.32	0.10	0.92	0.68

Item fit indices for Emotionally Stable (fC)*Table 34. Emotionally Stable (fC) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fC1	2.03	0.06	0.93	0.87
fC2	0.07	0.09	1.01	1.10
fC3	-0.78	0.05	1.02	1.03
fC4	0.96	0.06	1.24	1.51
fC5	-2.91	0.15	0.94	1.37
fC6	-1.06	0.06	0.93	0.85
fC7	2.39	0.05	1.00	1.02
fC8	2.00	0.06	1.10	1.25
fC9	-2.06	0.09	0.96	0.87
fC10	-2.00	0.08	0.96	0.86
fC11	1.62	0.06	1.05	1.08
fC12	1.65	0.06	0.95	0.89

Item fit indices for Dominant (fE)*Table 35. Dominant (fE) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fE1	1.42	0.06	0.97	0.98
fE2	0.72	0.07	1.04	1.10
fE3	0.01	0.09	0.99	0.99
fE4	1.47	0.05	1.00	1.02
fE5	3.14	0.06	1.03	1.11
fE6	1.70	0.05	1.08	1.09
fE7	1.10	0.05	0.96	0.93
fE8	-0.63	0.06	1.01	1.03
fE9	1.15	0.05	0.94	0.92
fE10	1.08	0.06	0.98	0.97
fE11	2.30	0.05	1.04	1.06
fE12	-1.33	0.07	0.98	0.95

Item fit indices for Enthusiastic (fF)*Table 36. Enthusiastic (fF) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fF1	0.54	0.08	1.00	0.89
fF2	3.15	0.06	0.93	0.86
fF3	1.45	0.05	1.03	1.04
fF4	1.82	0.05	1.10	1.14
fF5	2.29	0.05	1.02	1.02
fF6	2.26	0.05	0.96	0.94
fF7	1.85	0.05	1.01	0.99
fF8	2.09	0.05	1.12	1.24
fF9	0.90	0.06	0.93	0.89
fF10	1.34	0.05	0.99	0.97
fF11	0.55	0.06	1.01	1.12
fF12	2.11	0.05	0.91	0.87

Item fit indices for Conscientious (fG)*Table 37. Conscientious (fG) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fG1	0.65	0.09	0.86	0.70
fG2	1.07	0.07	1.01	1.03
fG3	0.04	0.06	1.08	1.19
fG4	1.47	0.06	1.13	1.23
fG5	0.87	0.08	1.07	1.36
fG6	1.13	0.06	1.06	1.12
fG7	0.10	0.09	0.87	0.58
fG8	0.42	0.07	1.16	1.42
fG9	0.87	0.08	0.97	0.95
fG10	0.53	0.09	1.01	1.19
fG11	0.00	0.12	0.97	1.01
fG12	0.76	0.07	0.88	0.83

Item fit indices for Socially-bold (fH)*Table 38. Socially-bold (fH) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fH1	2.62	0.05	0.99	0.96
fH2	1.41	0.06	0.94	0.86
fH3	1.55	0.05	0.98	0.96
fH4	1.17	0.06	0.93	0.85
fH5	0.19	0.08	0.96	0.89
fH6	2.64	0.05	1.10	1.19
fH7	2.32	0.06	0.89	0.83
fH8	0.86	0.06	1.00	1.00
fH9	2.20	0.05	1.16	1.22
fH10	2.21	0.05	0.94	0.91
fH11	0.28	0.06	1.08	1.16
fH12	1.10	0.06	1.10	1.21

Item fit indices for Tender-minded (fl)*Table 39. Tender-minded (fl) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fl1	2.17	0.06	1.00	0.98
fl2	1.99	0.05	1.04	1.06
fl3	2.93	0.05	0.98	0.97
fl4	1.97	0.05	0.98	0.97
fl5	2.18	0.05	1.00	1.00
fl6	1.61	0.06	1.02	1.04
fl7	2.77	0.05	1.05	1.06
fl8	2.00	0.05	0.95	0.94
fl9	2.06	0.06	1.06	1.09
fl10	1.73	0.05	0.97	0.96
fl11	0.15	0.08	1.01	1.07
fl12	0.63	0.10	1.02	1.18

Item fit indices for Suspicious (fL)*Table 40. Suspicious (fL) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fL1	1.43	0.06	1.02	1.08
fL2	1.94	0.05	0.96	0.95
fL3	1.91	0.05	1.00	0.96
fL4	1.99	0.05	0.93	0.92
fL5	2.66	0.05	1.10	1.14
fL6	3.37	0.06	1.04	1.11
fL7	2.20	0.05	1.03	1.05
fL8	2.34	0.06	0.97	0.92
fL9	1.97	0.05	0.98	0.96
fL10	1.68	0.05	1.06	1.15
fL11	1.63	0.05	0.92	0.90
fL12	4.57	0.11	1.00	1.01

Item fit indices for Abstract (fM)*Table 41. Abstract (fM) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fM1	3.21	0.05	1.04	1.06
fM2	2.60	0.05	1.00	1.00
fM3	0.64	0.06	0.98	0.96
fM4	2.62	0.07	1.02	1.08
fM5	0.95	0.06	0.98	0.97
fM6	1.50	0.05	1.00	1.03
fM7	2.87	0.06	0.93	0.88
fM8	3.30	0.08	1.01	1.07
fM9	2.60	0.05	1.03	1.07
fM10	2.09	0.05	0.98	0.96
fM11	-0.99	0.06	1.01	1.00
fM12	0.76	0.05	0.98	1.00

Item fit indices for Restrained (fN)*Table 42. Restrained (fN) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fN1	1.83	0.05	1.11	1.15
fN2	0.67	0.12	0.99	1.15
fN3	2.14	0.05	1.04	1.06
fN4	1.35	0.05	1.01	0.99
fN5	0.78	0.11	0.94	0.88
fN6	0.89	0.07	1.04	1.23
fN7	0.49	0.09	0.86	0.61
fN8	0.96	0.07	0.93	0.88
fN9	0.80	0.07	1.00	0.97
fN10	0.73	0.10	0.92	0.83
fN11	0.29	0.06	1.12	1.37
fN12	0.44	0.09	0.96	1.16

Item fit indices for Self-doubting (fO)*Table 43. Self-doubting (fO) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fO1	1.80	0.05	1.08	1.11
fO2	2.18	0.05	1.05	1.07
fO3	1.81	0.05	0.91	0.87
fO4	2.40	0.05	1.07	1.11
fO5	2.20	0.05	0.94	0.91
fO6	2.22	0.05	1.14	1.18
fO7	1.80	0.05	0.94	0.92
fO8	3.42	0.06	0.98	0.93
fO9	1.87	0.05	0.89	0.84
fO10	1.99	0.05	1.04	1.04
fO11	2.40	0.05	0.95	0.93
fO12	1.57	0.05	1.03	1.04

Item fit indices for Radical (fQ1)*Table 44. Radical (fQ1) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fQ ₁ 1	2.24	0.05	1.01	1.02
fQ ₁ 2	1.60	0.05	1.03	1.04
fQ ₁ 3	1.75	0.05	1.00	1.00
fQ ₁ 4	1.57	0.05	1.02	1.02
fQ ₁ 5	2.46	0.05	0.97	0.97
fQ ₁ 6	1.56	0.05	0.96	0.95
fQ ₁ 7	1.29	0.05	1.00	0.99
fQ ₁ 8	2.47	0.06	1.01	1.00
fQ ₁ 9	1.41	0.05	1.04	1.05
fQ ₁ 10	3.02	0.06	0.93	0.86
fQ ₁ 11	2.14	0.05	0.99	0.98
fQ ₁ 12	2.36	0.06	0.95	0.91

Item fit indices for Self-sufficient (fQ2)*Table 45. Self-sufficient (fQ2) Rasch Analysis Item Fit Indices for Overall Sample*

Item	Item Location	S. E	Infit	Outfit
fQ ₂ 1	1.97	0.06	1.14	1.43
fQ ₂ 2	2.86	0.06	1.06	1.11
fQ ₂ 3	1.55	0.05	0.99	0.97
fQ ₂ 4	2.49	0.05	0.95	0.94
fQ ₂ 5	3.97	0.07	1.14	1.33
fQ ₂ 6	1.97	0.05	0.91	0.89
fQ ₂ 7	2.37	0.05	1.07	1.12
fQ ₂ 8	2.17	0.05	0.92	0.89
fQ ₂ 9	2.82	0.06	0.93	0.89
fQ ₂ 10	2.71	0.05	1.05	1.06
fQ ₂ 11	3.25	0.06	0.96	0.91
fQ ₂ 12	1.90	0.05	0.88	0.84

Item fit indices for Self-disciplined (fQ3)

Table 46. Self-disciplined (fQ3) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fQ ₃ 1	0.42	0.12	0.92	0.74
fQ ₃ 2	0.19	0.12	0.91	0.74
fQ ₃ 3	0.87	0.06	1.08	1.18
fQ ₃ 4	-0.26	0.13	0.92	0.70
fQ ₃ 5	1.35	0.07	1.12	1.25
fQ ₃ 6	0.31	0.12	0.91	0.87
fQ ₃ 7	-0.59	0.12	1.02	1.24
fQ ₃ 8	2.72	0.05	1.07	1.16
fQ ₃ 9	0.07	0.16	0.89	0.54
fQ ₃ 10	0.08	0.10	0.95	0.92
fQ ₃ 11	0.53	0.08	1.02	1.12
fQ ₃ 12	0.46	0.07	1.01	1.08

Item fit indices for Tense-driven (fQ4)

Table 47. Tense-driven (fQ4) Rasch Analysis Item Fit Indices for Overall Sample

Item	Item Location	S. E	Infit	Outfit
fQ ₄ 1	3.40	0.06	0.96	0.92
fQ ₄ 2	2.41	0.05	0.97	0.98
fQ ₄ 3	2.55	0.05	0.94	0.94
fQ ₄ 4	3.37	0.06	0.92	0.87
fQ ₄ 5	1.67	0.05	1.06	1.08
fQ ₄ 6	2.08	0.05	1.10	1.16
fQ ₄ 7	2.26	0.05	1.03	1.03
fQ ₄ 8	2.37	0.05	1.01	1.00
fQ ₄ 9	2.90	0.05	0.97	0.96
fQ ₄ 10	2.88	0.05	0.98	0.97
fQ ₄ 11	2.35	0.06	0.94	0.92
fQ ₄ 12	1.56	0.05	1.00	1.00

Overall, the Rasch analysis of the 15FQ+ primary scales, presented in Tables 32 to 47 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 results support the argument that the scales demonstrate a sound degree of structural validity.

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 $\rho \geq .90$ 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 48 indicates strong invariance of item functioning across gender groups for the majority of the 15FQ+ primary scales. Most scales show excellent agreement in item difficulty rank ordering, with Spearman correlations at or above .90, suggesting very little concern for DIF. Correspondingly, median rank differences for these scales are 1.00 or lower, indicating good to excellent invariance, with items retaining largely the same relative difficulty positions across groups.

Factor β shows a slightly lower Spearman correlation ($\rho = .87$), which falls within the moderate agreement range and suggests the possibility of minor DIF; however, the median rank difference of 1.00 indicates that typical item shifts are small and remain within acceptable limits. According to the predefined cut-offs, Factor I, with a lower Spearman correlation ($\rho = .64$) and a median rank difference of 2.00, reflects weaker agreement in item ordering and moderate concern for DIF, indicating that a subset of items on this scale may function somewhat differently across gender groups. Importantly, this pattern reflects relative shifts in item difficulty ordering rather than pervasive misfit, and does not necessarily imply substantial bias at the scale-score level.

Table 48. DIF Analysis by Gender across primary scales

Scale	Spearman ρ	Median rank difference
fA	.97	1.00
fB	.87	1.00
fC	.93	0.00
fE	.98	0.00
fF	.99	0.00
fG	.94	1.00
fH	.98	0.00
fI	.64	2.00
fL	.97	0.00
fM	.99	0.00
fN	.96	1.00
fO	.94	1.00
fQ1	.99	0.00
fQ2	.97	1.00
fQ3	.98	0.25
fQ4	.97	0.00

Taken together, the findings suggest that the 15FQ+ primary scales demonstrate robust measurement equivalence across gender groups, with only isolated indications of potential DIF on the fI scale that may warrant closer item-level inspection but are unlikely to materially affect overall scale interpretation.

DIF across ethnic groups

Table 49 demonstrates that the DIF results across ethnic groups indicate generally good measurement equivalence for the 15FQ+ primary scales, with most scales showing acceptable to excellent agreement in item difficulty ordering and small typical rank shifts.

Several scales (e.g., fE, fF, fI, fL, fM, fN, fQ2, fQ3, and fQ4) demonstrate excellent agreement, with Spearman correlations at or above .90 and median rank differences of 1.00 or lower, indicating that items largely retain the same relative difficulty positions across ethnic groups. Median rank differences of 0.00–0.50 on many of these scales further support excellent to good invariance, suggesting minimal typical item-level shifts.

Table 49. DIF Analysis by Ethnicity across primary scales

Scale	Spearman ρ	Median rank difference
fA	0.90	1.00
fB	0.86	1.00
fC	0.76	2.00
fE	0.97	0.00
fF	0.94	1.00
fG	0.88	1.00
fH	0.88	1.00
fI	0.93	1.00
fL	0.97	0.00
fM	0.97	1.00
fN	0.96	0.50
fO	0.86	0.00
fQ1	0.87	1.00
fQ2	0.93	0.50
fQ3	0.96	0.50
fQ4	0.94	0.00

A subset of scales (fB, fG, fH, fO, and fQ1) show moderate agreement ($\rho = .86-.88$), which may indicate the presence of minor DIF; however, their median rank differences remain at or below 1.00, implying that typical item shifts are small and unlikely to have practical consequences for scale interpretation. Based on the predefined cut-offs, the fC scale shows comparatively weaker invariance, with a lower Spearman correlation ($\rho = .76$) and a median rank difference of 2.00, reflecting weaker agreement in item ordering and moderate concern for DIF, suggesting that some items on this scale may differ in relative difficulty across ethnic groups. As with the gender analyses, this pattern points to potential item-level differences rather than pervasive scale-level bias.

In summary, the evidence supports the conclusion that the 15FQ+ primary scales function largely equivalently across ethnic groups, with only isolated indications of potential DIF (most notably on the fC scale) that may warrant further item-level inspection but are unlikely to materially affect overall score comparability.

DIF across language groups

Table 50. DIF Analysis by Language across primary scales

Scale	Spearman ρ	Median rank difference
fA	0.99	0.00
fB	0.98	0.00
fC	0.98	0.50
fE	0.99	0.00
fF	1.00	0.00
fG	0.97	0.00
fH	1.00	0.00
fI	0.94	0.00
fL	1.00	0.00
fM	0.99	0.00
fN	0.99	0.00
fO	0.92	0.00
fQ1	0.99	0.00
fQ2	0.99	0.00
fQ3	0.93	0.00
fQ4	0.99	0.00

The DIF results across language groups reported in Table 50 indicate measurement invariance for the 15FQ+ primary scales. Spearman correlations are uniformly high ($\rho = .92$ – 1.00), reflecting very strong agreement in item difficulty rank ordering between language groups and minimal concern for DIF. Median rank differences are 0.00 for all scales except fC (0.50), which still falls within the range of excellent invariance, indicating that typical item difficulty shifts are negligible. Overall, the findings suggest that item functioning is highly consistent across language groups, providing strong evidence that the English-language administration of the 15FQ+ operates equivalently for respondents with different language backgrounds, provided they understand the item content.

Taken together, the DIF analyses across gender, ethnicity, and language provide converging evidence for the fairness and cross-group comparability of the 15FQ+ primary scales within the South African context. 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, and are unlikely to meaningfully affect score interpretation or decision-making, thereby supporting the use of the 15FQ+ in diverse assessment contexts. Gender-based DIF results indicate largely excellent agreement, with only Factor I showing moderate concern due to weaker rank-order agreement and larger

typical shifts. Ethnic group comparisons similarly show strong overall invariance, with isolated indications of potential DIF on Factor C. Importantly, these patterns reflect localised item-level differences rather than systematic scale-level bias. In contrast, language-based analyses show uniformly strong invariance across all scales, with no meaningful evidence of DIF.

Viewed collectively, the CFA, Rasch, and DIF findings align (Gomez-Benito et al., 2018), and supports the conclusion that the 15FQ+ measures the same underlying personality constructs in the same way across relevant demographic groups in South Africa. 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 validity, which is the extent to which the 15FQ+ scales relate to theoretically aligned personality constructs assessed by other measures.

Internationally, 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, Bar-On Emotional Quotient Inventory (EQ-i), Critical Reasoning Test Battery (CRTB2), Emotional Competencies Inventory (ECI), 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), Professional Personality Questionnaire (PPQ), Occupational Interest Profile Plus (OIP+), Occupational Personality Profile (OPPro), and the Work Habits and Attitudes Questionnaire (WHAQ). Detailed findings from these studies are reported in the international manual.

Locally, convergent validity evidence has been examined through studies relating the 15FQ+ to the Occupational Personality Questionnaire (OPQ32i), Personality and Values Questionnaire (PVQ), and Values and Motives Inventory (VMI). In addition, local replication studies have been conducted with the JTI and OPPro, drawing on overlapping samples available within the GeneSys database. 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 Jung Type Indicator

894 South Africans 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 51 are observed between conceptually aligned constructs, while correlations with non-corresponding dimensions are generally small.

Extraversion–Introversion (EI).

Enthusiastic (*fF*) and Socially-bold (*fH*) 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 (*fE*) also demonstrates a moderate negative relationship with EI ($r = -.39$), consistent with its interpersonal assertiveness content. Conversely, Self-sufficient (*fQ2*) correlates positively with EI ($r = .64$), reflecting a preference for autonomy and independence that aligns with introverted orientations.

Sensing–iNtuition (SN).

Abstract (*fM*) shows a substantial positive correlation with SN ($r = .69$), while Tender-minded (*fI*) is moderately related to this dimension ($r = .42$). Radical (*fQ1*) also demonstrates a meaningful association ($r = .39$), consistent with openness to new ideas and non-traditional perspectives.

Thinking–Feeling (TF).

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

Judging–Perceiving (JP).

A very strong correlation is observed between Conscientious (*fG*) and JP ($r = -.81$), indicating that higher conscientiousness is associated with a judging orientation characterised by structure, planning, and order. Self-disciplined (*fQ3*) also correlates meaningfully with JP ($r = -.31$), consistent with behavioural regulation and adherence to standards.

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 (*fE*) and Socially-bold (*fH*) show minimal associations with SN and TF, while Conscientious (*fG*) 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 local correlations demonstrate a clear pattern of convergence where conceptual overlap is expected, alongside low cross-domain correlations elsewhere, which is broadly consistent with findings reported in the international manual.

Table 51. Observed Correlation Estimates - 15FQ+ and JTI

	EI	JP	SN	TF
<i>fA</i>	-.30*	-.12*	.21*	.59*
<i>fB</i>	-.16*	-.31*	.20*	-.10*
<i>fC</i>	-.25*	-.36*	-.09*	-.15*
<i>fE</i>	-.39*	-.18*	.02	-.24*
<i>fF</i>	-.73*	.12*	.11*	.16*
<i>fG</i>	.05*	-.81*	-.14*	-.07*
<i>fH</i>	-.75*	-.09*	.16*	-.02
<i>fI</i>	.03*	-.03	.42*	.42*
<i>fL</i>	.15*	.09*	-.13*	-.20*
<i>fM</i>	-.09*	.31*	.69*	.21*
<i>fN</i>	.11*	-.32*	-.06*	.16*
<i>fO</i>	.29*	.16*	.06*	.27*
<i>fQ1</i>	-.12*	.33*	.39*	-.01
<i>fQ2</i>	.64*	-.01	.05*	-.11*
<i>fQ3</i>	-.02	-.31*	-.25*	-.02
<i>fQ4</i>	.09*	.23*	-.01	-.01

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

Relationships between the 15FQ+ and Occupational Personality Profile

416 South Africans completed both the 15FQ+ and OPPro between January 2020 and May 2024. The 15FQ+ factor Dominant (*fE*) 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 (*fH*) 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.

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 (*fG*) and Self-disciplined (*fQ3*) 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 (*fN*) 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 (*fI*) shows minimal association with assertive or dominance-related dimensions, while Conscientious (*fG*) and Self-disciplined (*fQ3*) 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.

Table 52. Observed Correlation Estimates - 15FQ+ and OPPro

	ASS	CON	ELC	FLE	GRE	PER	PHL	PRA	TRU	SC
<i>fA</i>	-.06	.01	-.04	-.08	.26*	.16*	.01	-.31*	.22*	.11*
<i>fB</i>	.30*	.09	-.25*	-.03	.09	.33*	.32*	-.17*	.16*	.26*
<i>fC</i>	.12*	-.28*	-.49*	-.05	.28*	.15*	.69*	-.11*	.42*	.47*
<i>fE</i>	.71*	.06	-.22*	-.11*	.29*	.38*	.34*	-.01	.01	.17*
<i>fF</i>	.16*	-.03	-.11*	.03	.68*	.43*	.23*	-.13*	.13*	.07
<i>fG</i>	.13*	.08	.09	-.54*	-.07	.02	.04	.08	-.08	.15*
<i>fH</i>	.47*	-.01	-.27*	-.02	.56*	.57*	.48*	-.21*	.14*	.26*
<i>fI</i>	-.18*	-.02	-.09	.20*	-.01	-.10	-.09	-.52*	.17*	-.04
<i>fL</i>	.16*	.33*	.42*	-.20*	-.22*	.07	-.31*	.13*	-.71*	-.21*
<i>fM</i>	.11*	.12*	-.12*	.18*	.11*	.31*	-.06	-.48*	-.01	-.07
<i>fN</i>	-.39*	-.11*	.02	-.26*	-.01	-.15*	.05	-.09	.19*	.19*
<i>fO</i>	-.25*	.30*	.37*	-.05	-.25*	-.23*	-.70*	.04	-.26*	-.44*
<i>fQ1</i>	.22*	.04	-.20*	.37*	.08	.19*	.07	-.27*	.05	.03
<i>fQ2</i>	-.18*	.18*	.16*	-.01	-.76*	-.32*	-.27*	-.01	-.22*	-.18*
<i>fQ3</i>	.08	.09	.17*	-.64*	-.05	-.00	-.01	.18*	-.14*	.10*
<i>fQ4</i>	.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.

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

Overall, the pattern of correlations reported in Table 53 for values above ± 0.30 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, *fA* (Empathic) correlates positively with Behavioural and Affiliative scales, while *fB* (Intellectance) shows strong negative associations with Worrying, Emotionally Controlled, and Modest, reflecting greater composure and confidence. Factors capturing sociability and influence, such as *fE* (Dominant) and *fF* (Enthusiastic), correlate positively with Outspoken, Controlling, Affiliative, and Outgoing scales, whereas *fG* (Conscientiousness) and *fM* (Abstract) show associations with Detail Conscious, Innovative, and Conceptual scales, indicating a blend of structured and creative tendencies. Socially bold, as reflected in *fH*, aligns negatively with Worrying, Modest, and Emotionally Controlled, but positively with Persuasive, consistent with interpersonal confidence. Other factors, including *fN*, *fQ1*–*fQ4*, show correlations with Rule Following, Conventional, and Tough Minded scales, supporting interpretations related to compliance, structure, and stress tolerance.

Table 53. Observed Correlation Estimates - 15FQ+ and OPQ32i

15FQ+ factor	OPQ scale
fA	Behavioural (.33), Affiliative (.30)
fB	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)

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

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

Note. * Statistically significant at the .05 level.

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 55, 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 (fE), Conscientious (fG), Self-disciplined (fQ3), 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 (fC; $r = .64$), alongside meaningful relationships with Dominant (fE), Enthusiastic (fF), Socially-bold (fH), 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 (fO) and Suspicious (fL) show consistent negative relationships with Achievement and Drive, reflecting how anxiety, mistrust, and self-questioning may undermine performance-oriented value priorities.

Table 55. Observed Correlation Estimates - 15FQ+ and PVQ Values Scales

		15FQ+															
PVQ _ Values		fA	fB	fC	fE	fF	fG	fH	fI	fL	fM	fN	fO	fQ1	fQ2	fQ3	fQ4
	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.

There are also strong correlations between Affiliation (AFFI) and the interpersonal-expressive factors Enthusiastic (fF; $r = .57$) and Socially-bold (fH; $r = .72$), reflecting shared emphasis on sociability, group belonging, and social engagement. Empathic (fA) and Tender-minded (fI) 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 (fQ2) 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 value Independence (INDE) shows strong positive convergence with Suspicious (fL; $r = .69$) and Self-sufficient (fQ2; $r = .58$), 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 (fL) and negatively with Empathic (fA), Emotionally Stable (fC), and Enthusiastic (fF), 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 (fI ; $r = .54$) and Abstract (fM), 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 (fE), Emotionally Stable (fC), and Intellectance (β), and negatively with Tender-minded (fI), 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 (fG) and Self-disciplined ($fQ3$). In particular, TRAD demonstrates a substantial positive association with Self-disciplined ($fQ3$; $r = .47$) and a strong negative relationship with Radical ($fQ1$; $r = -.62$), reflecting opposition between preference for established norms versus openness to change. Work Ethic also correlates positively with Conscientious (fG) and Self-disciplined ($fQ3$), supporting their shared emphasis on diligence, responsibility, and persistence.

Need for Safety (SAF) shows modest positive associations with Tender-minded (fI) and Emotionally Stable (fC), and negative relationships with Dominant (fE), Enthusiastic (fF), and Socially-bold (fH). 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 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 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 56. Observed Correlation Estimates _ 15FQ+ and VMI

	TRA	FIN	SEC	ALT	AFFI	AES	ETH	MOR	AFFE	IND	ACH
fA	.15*	-.07*	.07*	.35*	.27*	.27*	.09*	.18*	.34*	-.12*	.04*
fB	.11*	.04*	-.06*	.17*	.02	.27*	-.06*	.24*	.02	-.05*	.01
fC	.21*	-.13*	.03*	.09*	.17*	.13*	-.08*	.28*	-.04*	-.29*	.00
fE	.14*	.17*	-.10*	-.06*	.14*	.07*	-.05*	.14*	.03*	-.06*	.03*
fF	.08*	.14*	-.27*	.14*	.44*	.08*	.04*	-.03*	.30*	-.08*	-.04*
fG	.28*	-.05*	.24*	.05*	-.01	.09*	-.08*	.27*	.01	-.20*	.06*
fH	.23*	.03*	-.07*	.05*	.35*	.22*	-.05*	.12*	.19*	-.14*	.09*
fI	-.02	-.12*	.16*	.21*	-.01	.53*	.08*	.08*	.17*	-.02	.06*
fL	.03*	.10*	.06*	-.32*	-.23*	-.17*	-.04*	-.17*	-.17*	.20*	.03*
fM	-.14*	.10*	-.19*	.10*	.03*	.28*	.06*	-.10*	.15*	.23*	.02
fN	.26*	-.10*	.27*	.11*	.07*	.12*	-.03*	.22*	.06*	-.23*	.07*
fO	-.14*	.10*	.05*	.04*	-.10*	-.07*	.08*	-.13*	.12*	.21*	.01
fQ1	-.32*	.05*	-.23*	-.02	-.03*	.09*	-.02	-.20*	-.01	.25*	-.02
fQ2	-.19*	-.02	.06*	-.11*	-.67*	-.07*	.02	-.05*	-.30*	.19*	-.04*
fQ3	.42*	.00	.13*	-.01	.05*	-.10*	.12*	.25*	.02	-.18*	.09*
fQ4	-.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 (*fA*) 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 (*fF*) and Socially-bold (*fH*) 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 (*fC*) 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 (*fO*) and Tense-driven (*fQ4*) 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 (*fQ2*). 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 (*fQ3*) correlates positively with Traditional, Moral, and Security values, indicating a preference for structure, rule adherence, and ethical consistency. Conscientious (*fG*) 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 (*fI*) and Abstract (*fM*) are positively associated with Aesthetics, reflecting an appreciation for imagination, symbolism, and subjective experience. Radical (*fQ1*) 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.

Criterion Validity

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 South African 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 57.

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 57. Multiple Regression: Production Prediction

Predictor	β	B	SE (B)	t	p
Enthusiastic (fF)	.330	229 170	74 544	3.07	.003
Numerical Critical Reasoning	.277	194 493	70 462	2.76	.007
Intellectance (fB)	-.342	-210 758	61 210	-3.44	< .001
Empathic (fA)	.329	259 242	87 473	2.96	.004
Tender-minded (fI)	-.313	-195 430	70 740	2.76	.007
Abstract (fM)	.076	53 750	76 609	0.70	.485
Suspicious (fL)	-.168	-106 352	65 506	-1.62	.109
Self-sufficient (fQ2)	.187	124 872	76 861	1.62	.108
Socially-bold (fH)	.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 58.

Table 58. Multiple Regression: Number of Policies Sold

Predictor	β	B	SE (B)	t	p
Enthusiastic (fF)	.466	3.55	.83	4.27	< .001
Intellectance (fB)	-.325	-2.20	.64	-3.42	.001
Tender-minded (fI)	-.259	-1.78	.76	-2.33	.022
Socially-bold (fH)	.249	1.47	.71	2.07	.042
Self-sufficient (fQ2)	.241	1.75	.85	2.06	.042
Empathic (fA)	.210	1.80	.99	1.82	.073
Self-doubting (fO)	.178	.97	.58	1.66	.101
Suspicious (fL)	-.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 59 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 59. 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 60.

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 61. 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 60. 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 61. 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 South African insurance organisation. The sample comprised predominantly male managers (85%), with a mean age of approximately 40 years ($SD \approx 6.6$).

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. 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 62. 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+: Apprehension (fO)	~72%

NORMS

Raw scores on the 15FQ+ primary and global scales are transformed into standardised scores using normative reference distributions derived from South African samples. For reporting purposes, scores are primarily expressed as sten scores, which allow for intuitive 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. Percentiles are derived directly from the cumulative distribution of raw scores within each norm group and should be interpreted as descriptive indicators rather than precise estimates of population standing.

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. Additional information about the sample biographical data for each norm option is available on-platform to support decisions related to suitability of a specific norm option over others. Norm groups should not be selected solely to obtain more favourable score profiles. Interpretations should always be grounded in the assessment purpose and supported by multiple sources of information.

Norms are periodically reviewed and updated as additional South African data become available. Users are encouraged to ensure that the most current norms are selected when interpreting results, particularly in applied decision-making contexts. The dates reflected in Table 63 indicate the most recent update for each norm group.

Table 63. 15FQ+ South African Norm Options

Date Updated	Name	Sample Size
2025	RSA Graduates (Updated 2025)	22591
2025	RSA Managers (Updated 2025)	21564
2025	RSA Senior Managers & Chief Executives	9409
2025	RSA Sales Representatives (Updated 2025)	1153
2025	RSA IT & Communications Professionals (Updated 2025)	2504
2025	RSA Young People (18-21) Updated 2025	668
2016	RSA Afrikaans Speakers	2999
2016	RSA Aggregate Population	20374
2016	RSA English Speakers	5473
2016	RSA Indigenous Language Groups	4734
2016	RSA isiXhosa Speakers updated	886
2016	RSA isiZulu Speakers	1426
2016	RSA Sepedi Speakers	590
2016	RSA Sesotho Speakers	664
2016	RSA Setswana Speakers	660
2016	RSA siSwati Speakers	112
2016	RSA Tshivenda Speakers	149
2016	RSA Xitsonga Speakers	192
2016	RSA Contact Centre Staff	290
2016	RSA Utility Security Staff	520

SUMMARY

The psychometric properties of the 15FQ+ for the South African population were evaluated on a large and diverse sample of South African working adults ($n = 18\,191$). Overall, the assessment appears appropriate for use within South African contexts. The following points summarise the key findings of the psychometric analyses:

- The majority of the 15FQ+ primary scales demonstrated acceptable to good internal consistency across the overall sample, with median reliability coefficients in the satisfactory range. Reliability estimates were broadly comparable across gender, ethnic, and language groups, indicating stable internal consistency across key demographic subgroups.
- Exploratory factor analysis yielded a factor structure that was broadly consistent with the international solution. While some differences in factor loadings and factor polarity were observed, the overall pattern of associations supported the intended organisation of the primary scales.
- Confirmatory factor analyses provided converging support for the structural validity of both the primary and global factor models of the 15FQ+. Model fit indices indicated acceptable to good fit across the overall sample as well as across gender, ethnic, and language groups and patterns of fit were consistent across demographic groups, supporting structural (functional) equivalence.
- Across CFA subgroup analyses, the primary factor structure demonstrated robust configurational and metric equivalence across gender, ethnicity, and language groups. The stability of fit patterns across groups further supports the cross-group comparability of the instrument.
- Rasch analyses of the primary scales indicated that items generally fit the model well. Infit statistics consistently fell within acceptable ranges, suggesting that item responses aligned with expectations across levels of the underlying traits, supporting the structural integrity and measurement quality of the primary scales.
- DIF analyses across gender, ethnic, and language groups provided strong evidence for the fairness and cross-group comparability of the 15FQ+ primary scales. The majority of scales demonstrated excellent to good invariance, with high agreement in item difficulty ordering and minimal typical rank shifts. Any observed DIF was localised, did not converge across demographic comparisons, and was unlikely to impact scale-level scores or decision-making.
- Statistically significant mean differences were observed across some demographic groups; however, effect sizes were generally small and consistent with established personality research. These differences are interpreted as reflecting substantive trait

variation rather than measurement bias, and do not raise concerns regarding the equitable use of the instrument.

- Patterns of inter-scale correlations supported the discriminant validity of the primary factors, with limited construct overlap and theoretically meaningful associations. Comparisons with other instruments supported the convergent construct validity of the 15FQ+ and its alignment with established personality frameworks.
- The 15FQ+ demonstrated meaningful predictive and concurrent validity for job performance outcomes across multiple South African samples, including insurance sales production, policy volumes, interview-based competency ratings, and managerial competencies. Multivariate models explained substantial proportions of variance in sales performance (approximately 39–44%), while discriminant analyses showed good classification accuracy (typically ~65–75%) across key managerial competencies.
- A comprehensive set of South African norm groups is available, including general population, occupational, age-based, and language-based norms. DIF and invariance findings support the use of these norms for contextualised interpretation rather than bias correction.

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