



White Paper

The Development, Validity and Reliability of our Five Factor and Emotional Intelligence Assessment

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Overview

Although Australian businesses consistently and diligently utilise a multitude of metrics and systems designed to report against almost all aspects of their operations, there exists a noticeable gap in the area which arguably contributes most significantly to business performance: human capital.

When it comes to behaviour at work, our underlying personality plays a critical role in performance, Barrick & Mount (1991) finding a statistical relationship between the two. How we approach various tasks, how we connect with others, how we manage challenges and adversity, how we lead and learn are all intrinsically linked to who we are, and is therefore worthy of consideration when making people decision within a workplace environment.

TALY was created because too few Australian organisations have access to the benefits that come from a comprehensive understanding of their people; and even with such insights, little concept as to their implications or effective use long term. By addressing this industry need and creating an academically valid and reliable tool, TALY aimed to deliver measureable and interpretable human insights that change organisational performance. As no one individual, team or business is the same, there was also a need to create a tool that could be augmented to include bespoke metrics to address more specific business challenges.

Gaining a deep and relevant insight into personality and how personality relates to job performance has been an area of strong focus in psychology, management and academic communities for many years. The seminal meta-analysis in the area, compiled by Barrick & Mount (1991) clearly articulates this journey, highlighting the consensus within the academic sphere on the qualities and validity of the Five Factor Model (FFM) approach and its relationship to performance. This established academic convention uses factor analysis to reveal five core personality traits: conscientiousness, agreeableness, extraversion, openness and emotionality/neuroticism. (Costa & McCrae, 1992) As it is the only consistently accepted approach to understanding personalities, particularly within the field of organisational psychology, TALY began creation of the first TALY survey using the Five Factor Model as a base and norming

the results for Australia. From the data, TALY created a simple digitised survey, providing valid and reliable personality profiles and reports in a fast, cost efficient and user-friendly way. The reports included useful insights specific to job performance and in some instances to industry and/or role.

Subsequent academic research revealed the importance of the psychological concept of Emotional Intelligence (EI) and its relationship to performance and leadership in particular. Based on the approach by Mayer & Salovey (1997) and their four branch model, TALY created an updated Five Factor Model based survey which included Emotional Intelligence. This new survey was again normed for Australia. The combination of the two metrics allows TALY to provide a more comprehensive view of an individual and facilitated the creation of additional personality modules including propensity to take risk.

This paper aims to provide additional information on the way in which the existing TALY tools have been created, their relevance, inclusions and validity.

The Importance of Emotional Intelligence

Over the last decade Industrial and Organisational (I/O) psychologists have progressively considered emotional aptitudes in the workplace as an important aspect of job related work performance (Cadman & Brewer, 2001). The importance of general mental ability ('g') in job related performance is well established in the literature (Tenopyr, 2002). Recent advancements in test development in the area of emotional intelligence has shifted the focus of interest in predicting workplace performance from Intelligence and Personality onto Emotional Intelligence (EI). Contributing to this movement is the recognition that emotions and interpersonal relationships in the workplace significantly contribute to workplace performance (Goleman, 1998). Indeed, some authors have argued that EI may predict performance, over and above more established measures, such as general intelligence (Lam & Kirby, 2002) and personality (Van Der Zee, Thijs & Schakel, 2002; Mayer, 2001). Consistent with this development, after initially developing a Five Factor Instrument to gather information about the personality traits, and the behaviours of Australian workplace personnel, TALY recognised that integrating our Five Factor Instrument with a bespoke measure of Emotional Intelligence would provide a significant advantage to TALY's clients. Given that one of the hallmarks of a leading-edge organisation is the successful application of performance measures to provide insight into and to make judgments about the organisation, and the effectiveness, of its programmes, processes and people (Amaratunga, Baldry & Sarshar, 2001). TALY believes the integration of the Five Factor Model (FFM) measure, with measurement of Emotional Intelligence (EI), will produce a product that will inform individuals and organisations about key aspects of psychological functioning within the workplace that drive individual, team, and organisational performance.

Predicting Job Performance: IQ, Personality and Emotional Intelligence

Intelligence and Performance

General mental ability (intelligence or g) is the dominant determinant of the large individual differences in work output across occupations revealed by research (Hunter & Schmidt, 1996). Some researchers state that the major reason general mental ability predicts performance so well is that higher ability individuals learn relevant job knowledge more quickly and therefore learn more of it (Hunter & Schmidt 1996). According to Gottfredson (2002) 'g' is a highly general capability for processing complex information of any type. She claims that predictive validity of 'g' for job performance is because 'g' loaded measures assess the ability to process and comprehend complex tasks. Furthermore, Gottfredson indicates that it is complexity which is the major distinction among job skills, explaining why 'g' is more important further up the occupational hierarchy. Whilst IQ assessment is not part of the TALY suite of assessments, it is not only important to acknowledge the role, 'intelligence' plays in predicting job performance, but to understand the 'value-add' of assessment of Personality of EI assessments within the workplace.

A meta-analysis conducted by Vinchur, Schippmann, Schwitzer and Roth (1998) evaluated predictors of objective (outcome based effectiveness) and subjective (supervisor ratings) ratings of sales performance. They examined the Big Five factors of personality (Digman, 1990) as well as verbal, quantitative and general (g) intelligence. The authors noted Potency (a component of Extraversion) predicted supervisor ratings of performance ($r = 0.28$) and objective measures of sales ($r = 0.26$). In addition, Achievement (a component of Conscientiousness) predicted ratings ($r = 0.25$) and objective sales ($r = 0.41$). Whereas, 'g' was shown to predict supervisor ratings ($r = 0.40$) and objective measures poorly ($r = 0.04$). Vinchur and colleagues concluded that more research is required in the domain of psychological predictors of job performance. Also while 'g' was shown to predict rating criteria but not sales volume it was suggested that more development should be expended in developing better performance measures. Finally, as the most promising predictors of objective and subjective measures of performance were components of the Big Five factors of personality it was suggested that personality be incorporated into job related

performance research. This suggestion is consistent with Hunter and Schmidt's (1996) arguments that the use of mental ability in hiring is well founded scientifically. Hunter and Schmidt, also encourage the use of personality measures that increase overall predictive validity over and above IQ measures.

Personality and Performance

While there are some more obvious criterion related outcomes for intelligence, such as academic success, personality measures are also currently considered as a relevant procedure for personnel selection (Salgado, 2003). Witt, Burke, Barrick and Mount (2002) state that personality traits interact with each other, resulting in desirable, as well as undesirable, workplace behaviours. In personality research, Conscientiousness has been the most consistent and universal predictor of job performance (Barrick, Mount, & Judge, 2001). A meta-analysis performed by Barrick, Mount and Stewart (1998) investigated the degree to which the Five Factor Model (FFM) of personality (Digman, 1990) was related to performance in jobs involving interpersonal interactions. The FFM represents the most basic dimensions underlying the traits of personality (Costa & McCrae, 1992), consisting of five domains; Emotional Stability, or Neuroticism - the tendency to experience negative affect (for example anger and sadness) and a susceptibility to psychological distress; Extraversion - exhibiting such traits as assertiveness, energetic and optimistic; Openness - exhibiting traits such as active imagination, intellectual curiosity and independence of judgement; Agreeableness - Fundamentally altruistic, sympathetic and eager to help; and Conscientiousness - the tendency to actively plan and organize tasks, being purposeful and determined (Costa & McCrae, 1992). Results indicated that Conscientiousness and Agreeableness Extraversion were all positively related to performance in jobs involving interpersonal interactions. It was also noted that Neuroticism and Agreeableness were more strongly related to performance in team-work tasks (interdependent interaction with co-workers), than in tasks which involve direct service between employees and customers. These findings were developed in a later study by Barrick, Mount and Judge (2001) wherein the FFM of personality was examined against more specific occupational groups (sales, managerial, professional, police and semi-skilled laborers). It was shown that Conscientiousness remained a

significant predictor of overall job performance as well as all performance measures across all occupations. Furthermore, Neuroticism was generalisable to overall job prediction but did not relate as strongly to specific job performance criteria as Conscientiousness. Finally, Barrick, Mount and Judge showed that, while Agreeableness, Extraversion and Openness failed to significantly predict overall job performance they did relate to certain facets of performance measurement in different occupational groups.

To further explore the role of the FFM, and in particular Conscientiousness, Witt, Burke, Barrick and Mount (2002) examined the interaction effects of Conscientiousness and Agreeableness on job performance. They hypothesised that the relationship between Conscientiousness and job performance would be stronger for persons high in Agreeableness than for those low in Agreeableness. It was shown that of highly conscientious workers, those low in Agreeableness were found to receive lower ratings of job performance than workers high in Agreeableness in five of the seven studies analysed. Witt and colleagues claim the lack of interaction between Conscientiousness and Agreeableness in remaining samples was due to the absence of cooperative interactions with others within the workplace. The authors concluded that highly conscientious workers who lack interpersonal sensitivity may be ineffective, particularly in jobs requiring cooperative interchange with others. It is these types of interactions between Personality dimensions that the TALY measure is designed to interpret, and to provide recommendations upon to potential or current employers and employees.

A study by Salgado (2003) compared the FFM of personality and non-FFM inventories with job performance in a meta-analysis of 92 American and European studies on personality and performance. Employing supervisory ratings of overall job performance as opposed to individual facets of workplace performance Salgado found that Conscientiousness was more operationalised in the FFM inventories than in the non-FFM inventories. Also Neuroticism was shown to have a much larger operational validity when measured with a FFM inventory than a non-FFM inventory, while Agreeableness, Extraversion and Openness were not shown to relate to job performance (Barrick, Mount & Stewart, 1998; Barrick, Mount & Judge, 2001).

Salgado concluded that practitioners would benefit from the utilization of inventories based on the FFM of personality for personnel selection. It is these types of insights from FFM personality profiling that TALY utilises in our suite of products that inform respondents on how they perceive the world, how they understand themselves, and how their behaviours affect their job performance and workplace interactions.

Emotional Intelligence and Performance

As part of the emerging work in the area of EI, there has been several approaches to defining the construct. Generally, these theories fall into two broad categories, ability models and mixed models. The ability model of EI, first conceptualised by Salovey and Mayer (1990) and further developed in 1997 (Mayer & Salovey, 1997) defines EI as the ability to perceive, appraise and express emotion in oneself (and others), the ability to utilise emotions to facilitate thought and to regulate emotions for emotional and intellectual growth (Mayer & Salovey, 1997). Mayer and Salovey (1993) propose that EI is a developmental construct which progresses from basic psychological stages to more integrated and complex processes. The model identifies EI as a discrete intelligence, viewing it as a class of mental ability, focussing on how emotions facilitate thinking and adaptive behaviour. As an ability, EI has been hypothesised to mimic cognitive measures of intelligence and therefore is measured by a series of performance tasks. These approaches differentiate the ability model of EI from the mixed models, such as the competency based model proposed by Goleman (1998b; 2001) and the non-cognitive model proposed by Bar-On (1997). Mixed models regard emotional intelligence as set of traits and are typified by characteristics similar to that of personality. Bar-On (1997) views EI as an array of non-cognitive capabilities, competencies and skills which facilitate one's ability to cope with environmental demands and pressures. It is perhaps more appropriate to refer to the non-cognitive model of EI as an operationalised model of social and emotional intelligence. It covers a broader spectrum of potential abilities based on processes measured by personality than the ability model, and relates to the potential for performance in life and in the workplace rather than performance itself (Gardner & Stough, 2002).

Theoretically, EI appears to have great face validity in predicting workplace performance; however, empirical evidence is limited. A study by Bachman, Stein,

Campbell and Sitarenios (2000), reported the use of Bar-On's (1997) Emotional Quotient Inventory in an organisational setting. Emotional intelligence was examined as a predictor of job performance in 36 debt collectors. The authors claimed higher levels of EI would lead to enhanced job performance. Performance was assessed by the cash goal attained over time and participants were grouped into 'best practices' (consistently high earner) and 'less successful' (consistently low earners). Results showed that the best practices group were significantly higher on overall EI and three of the five constructs outlined by Bar-On (1997). Bachman et al concluded that the utility of EI in an organisational setting and has important implications for the future use of EI in the workforce.

It has been stated that in professional and technical professions IQ itself provides little discrimination between exceptional and regular personnel (Watkin, 2000; Goleman, 1998a), which has suggested to some commentators that EI is the primary influential factor which sets star performers apart in senior level management (Goleman, 1998a). Cadman and Brewer (2001) maintain that high IQ people are more likely to employ convergent thinking and be less intuitive and less likely to display social intelligence than divergent thinkers, who produce more novel ideas and perform better at problems. The authors also state that people with a high emotional aptitude tend to accept responsibility, act ethically and adapt to stress better than high IQ people who are more critical, ambitious and emotionally cold (Cadman & Brewer, 2001) concluding that divergent thinking, and hence more social and emotional aptitudes are essential prerequisites for exceptional performance. Abraham (1999) examined the relationship between EI and work group cohesion, as well as EI and organizational commitment, claiming that EI is directly related to performance. She proposes that EI fosters an ability to draw upon emotional knowledge for decision making which assists individuals in focusing on a particular problem at hand. Furthermore, at the level of the work group, EI is apparent in synergistic relationships among workers, forming the basis of greater contribution of skills and competencies within groups (Abraham, 1999). Results indicated that the more cohesive group's performance surpasses that of other groups with similar technical, but fewer social, skills (Abraham, 1999; Goleman, 1995). Abraham suggests a necessity for emotionally intelligent values in interpersonal relations, as they enhance the productivity of organisational work groups.

Shutte and colleagues (2001) examined the relationship between EI and interpersonal relations in a series of studies. They reported higher scores in EI corresponded with more empathy, self-awareness and better social skills, identifying more emotionally intelligent people as more co-operative with and successful in close and affectionate relationships. Shute et al concluded that EI was associated with interpersonal relationships and therefore argued that EI was a principal component to effective workplace performance. An earlier study by Sosik (1999) employed Goleman's competency based model of EI (Goleman, 2001) to examine self-awareness (agreement between self and other leadership ratings) as a mediator for EI and transformational leadership as well as transformational leadership and managerial performance. Sixty-three managers were examined with results indicating a partial relationship between EI and leadership, with self-awareness, self-management and relationship management (Goleman, 2001) correlating significantly with transformational leadership. It was also shown that for managers whose self-ratings were in agreement with other ratings, transformational leadership styles significantly correlated with managerial performance. Sosik also noted the inverse for management in disagreement with others ratings. Such findings suggest that organisations should promote training programs regarding EI or target emotionally intelligent employees into higher-level positions.

Bass (2002) presents some interesting empirical support for the cognitive, social and emotional intelligence of transformational leaders. Over several studies, it was shown that charismatic and inspirational managers use better judgment and hence make better decisions, whereas intellectual achievement and cognitive intelligence failed to distinguish between leadership styles. Additionally, it was shown that transformational leaders are more careful listeners and better communicators. Finally, Bass (2002) reported the traits of EI provided the most extensive evidence of correlations with transformational leadership, including self-acceptance, sense of responsibility and personal adjustment. This evidence provides support for the efficacy of EI over and above the influence of cognitive and social intelligences, it must be noted however that there was little conformity to the measurement of EI in the studies referred to in Bass (2002).

A study by Lam and Kirby (2002) was more focussed on the impact of EI on performance over and above general intelligence. They considered whether EI predicts cognitive performance, over and above general intelligence. Three hundred and four undergraduate students completed the Multifactor Emotional Intelligence Scale (MEIS), the IQ scale and a performance task. It was shown that EI contributed to individual cognitively based performance over and above that of general intelligence. Lam and Kirby concluded that individuals high in EI may be better equipped to segregate emotions and hence resist the negative, inhibitory effects of intense emotions and hence concentrate better on cognitive tasks (Lam & Kirby, 2002). The association between general intelligence and EI shows promise for the efficacy of the construct in an organisational application. Reinforcing this potential for application are studies examining EI and personality. Van Der Zee, Thijs and Schakel (2002) examined the relationship of self and others ratings of EI with academic intelligence and personality, as well as the validity of EI to predict academic and social success over and above intelligence and the Big Five personality dimensions. The authors reported significant weak, negative relationships between EI and academic intelligence. These findings are in line with Cadman & Brewer's (2001) opinion that high IQ people are less socially intuitive. Results also indicated that the Big Five significantly predicted some of the variance in EI; however, not enough to warrant the claim that EI is nothing more than personality and social traits (Van Der Zee et al, 2002). Most interestingly, the authors report that EI was a greater predictor of academic and social success than intelligence or personality.

Goleman (2001) contends that IQ will remain the single greatest predictor of performance as it screens most individuals at an entry level for the workforce, while EI will be more beneficial for use within established positions in the workforce, providing insight as to which employees are better suited for promotion. George (2000) concurs with Goleman; she considers the role of EI in leadership and workplace performance to be central to the future of many industries and maintains that EI will contribute to effective leadership by fostering essential elements of leadership performance. These studies have provided empirical justification for the claim that EI may predict success in the workplace. These studies' in part have informed the evolution of the TALY instrument. Wherein, we have now undertaken

a third norming study with the aim of re-calibrating our FFM measurement, and additionally, incorporate a new assessment of EI.

As such, the aim of this White Paper is to detail the secondary norming of our FFM measure and the development of an integrated EI assessment with regard to critical psychometric evaluations. These evaluations will address the:

- 1) **Validity:** is the TALY instrument adequately measuring the FFM of Personality and Emotional Intelligence.
- 2) **Reliability:** are respondents answering the items across sub-scales consistently, and are these items providing adequate precision to discriminate between respondents.

Methodology

When the decision was made at TALY to expand out suite of assessment, some key considerations needed to be taken into account. We acknowledged that the updated the instrument needed to meet the same range of psychometric requirements that our initial measure did, in order to ensure that our products are of the highest quality. As detailed in the initial White Paper, we evaluated two core psychometric properties: 1) Validity, and 2) Reliability. For Construct Validity, this was achieved through two phases. The first phase is a detailed examination of the theoretical underpinnings of the FFM. This informed the design of the measure, making it such that it conformed to the theoretical structures as outlined in the peer-reviewed literature. The second phase assessed construct validity by using Confirmatory Factor Analysis (CFA) to measure the extent to which structures in the data replicate the theoretical five factor structures. As for Internal Reliability, we assessed this using a standard statistical method known as Cronbach's Alpha, which examines the internal consistency of the measure across items pertaining to each five factor scale, as well within the sub-traits used to define these five factors. In developing this updated measure, we again utilised both of these psychometric techniques. Additionally, we employed an Item Response Theory (IRT) analysis. Consistent with the evolution of the TALY measure to incorporate EI outcomes as best-practise in an ever changing workplace environment; an IRT approach reflects the evolution of questionnaire development. The use of IRT

has allowed TALY to evaluate the psychometric properties of our existing FFM scale and its items, to optimally shorten the scale when necessary, and to evaluate the performance of the reduced scale alongside our EI measure. In this case IRT modelling has enabled us to produce precise, valid, and relatively brief instrument that assesses both Personality and EI will not incurring significant response burden for respondents.

Validity

The psychometric validity of a survey instrument can be defined as the extent to which an instrument measures what it purports to measure. The most salient assessment of validity for the TALY instrument, is Construct Validity. Construct Validity is concerned with the extent to which questionnaire items relate to the theoretical underpinnings of the survey instrument. That is, do the questions that have been generated in the development of the TALY instrument 'tap-in-to' the theoretically defined aspects of the FFM of Personality and EI. Having outlined how the design of the Instrument conforms to the theoretical structures of the FFM and the dominant model of EI, we then will utilise Confirmatory Factor Analysis (CFA) to measure the extent to which data generated factors replicate the theoretically defined FFM and EI scales.

Reliability

The psychometric reliability of a survey instrument can be defined as the 'consistency' with which it measures what it claims to measure. The standard measure of 'reliability' is Cronbach's Alpha. This assessment measures how consistently respondents score on items from a similar scale, or sub-scale. Thus, Cronbach's Alpha gives an indication of whether individual responses to items are internally consistency, and provides an estimate of the reliability of test scores. The Alpha score is generated from the inter-correlations among test items, and they are maximised when all items measure the same construct.

Item Response Theory

Item response theory (IRT) was first proposed in the field of psychometrics for the purpose of ability assessment. It is now more widely used to calibrate and evaluate items in questionnaires that purport to measure abilities, attitudes, or other latent traits. IRT is considered part of the 'New Psychometrics' movement, where "how" people respond to items that are considered part of a latent trait is of paramount importance. At the simplest level, the probability of endorsing a certain (correct) response on a personality or EI item will be a single peaked function of the level of that attribute. As EI and personality items reflect average or routine thoughts, feelings and behaviours, IRT allows us to examine whether certain items provide consistent estimates of the trait being assessed. For example, someone who is "Highly Conscientious" should be responding high on the majority of conscientiousness items in the TALY instrument. Additionally, IRT also allows us to examine whether the likelihood of an entire sample of people (scoring high, medium or low on conscientiousness) of endorsing certain responses (1 = low, through to 7 = high) varies according to their average 'trait' score. Simply, does everyone score high on an item, or do people score appropriately high or low on the item considering their pattern of responses to other related items. This technique has allowed the new TALY instrument to be screened for items that show little 'discriminability' between people, and those items that have powerful variability in their responses from people.

Construct Validity

Personality

Personality traits are defined as enduring patterns of perceiving, relating to, and thinking about the environment and oneself that are exhibited in a wide range of social and personal contexts (DSM-IV-TR; APA, 2000). These traits are suggested to remain constant over time, vary between people, and direct people's behaviour. A number of theories and approaches have been generated to assess personality, with trait measures generally assessing between three and five dimensions. Today, most personality researchers regard the FFM as the standard nomenclature for describing

the structure of personality. This model was empirically defined, which consistently has statistically produced five dimensions of personality, which are normally distributed across the population, with a preference for certain types of personality aspects being indicated by strength of score (e.g., the higher the extraversion score, the more extraverted someone's behaviours are). This dominant model of personality is alternatively referred to as the 'Big 5', which assesses the following dimensions (Digman, 1990):

Neuroticism: the tendency to be calm, secure, and self-satisfied versus being anxious, insecure, and self-pitying.

Extraversion: the tendency to be sociable, fun-loving, and affectionate versus being retiring, somber, and reserved.

Openness to Experience: the tendency to be imaginative, independent, and interested in variety versus being practical, conforming, and interested in routine.

Agreeableness: the tendency to be softhearted, trusting, and helpful versus being ruthless, suspicious, and uncooperative.

Conscientiousness: the tendency to be organised, careful, and disciplined versus being disorganised, careless, and impulsive.

Emotional Intelligence

The emerging construct of emotional intelligence may offer a means to assess how individuals generally experience, express, understand, use, manage and control their emotions within the workplace. As people differ in their ability to perceive, utilise, regulate and understand emotional information and this contributes to their emotional and intellectual growth – an understanding of these capacities may elucidate the importance of the emotional factors inherent in the Australian workplace. Assessments of 'trait' levels of emotional intelligence have previously been associated with positive life and workplace outcomes. In regards to life outcomes, recent studies

suggest that higher levels of emotional intelligence lead to greater feelings of emotional well-being (Bar-On, 1997; Goleman, 1995), reduced psychological stress (Slaski & Cartwright, 2003), higher positive mood (Schutte, Malouff, Simunek, McKinley & Hollander, 2002), higher self-esteem (Schutte, et al., 1998), lower depression (Downey, et al., 2008), higher optimism (Schutte, et al., 1998) and greater life satisfaction (Dawda & Hart, 2000). Additionally, positive relationships have also been observed between EI measures and workplace indicators such as job performance (Janovics & Christiansen, 2001); effective leadership (Downey, Papageorgiou & Stough, 2006); job advancement (Dulewicz & Higgs, 2000); team effectiveness (Druskat & Wolff, 2001); organisational commitment (Nikolaou & Tsaousis, 2002); reduced workplace stress (Nikolaou & Tsaousis, 2002); sales performance (Wong, Law & Wong, 2004); supervisory ratings of job performance (Slaski & Cartwright, 2002); selection interviews (Sosik & Mengerian, 1999); and adaptive conflict resolution techniques (Jordan & Troth, 2004).

EI is a form of social intelligence that enables individuals to recognise and effectively deal with their own and other emotions (Mayer, Salovey, & Caruso, 2004). EI is broadly defined as an individual's proficiency in the adaptive, efficient and constructive use of emotional information (Mayer, et al, 2004), and more specifically as comprising the understanding, expression, recognition, management, control, utilization, comprehension and cognitive use of emotional information (Luebbbers, Downey, & Stough, 2007). The conceptualisation of EI as a form of intelligence follows from the logic that one's emotional state and understanding convey important information regarding their relationships with others and the environment (Mayer et al., 2004). Moreover, emotional information helps to provide meaning and emotional valence to an individual's interpersonal and environmental relationships (Luebbbers et al., 2007). In turn, higher levels of EI have been linked to a myriad of social and emotional outcomes over the past 20 years of research (Stough, Saklofske, & Parker, 2009) across child, adolescent and adult populations. In their model of EI, Salovey and Mayer (2004) conceptualise EI as distinct set of mental abilities that facilitate the processing of emotional information. These abilities are conceptualised as branches, each of which deal with separate but related aspects of emotional processing. These

are; the perception and identification of emotions, the use of emotional information to facilitate thought, emotional reasoning and understanding, and emotional self-management.

Perception and identification of emotions: abilities range from the ability to recognise emotions in oneself and others to the ability to discriminate subtle expressions of emotion. Furthermore, these are considered necessary pre-conditions for further processing of

emotional information for use in decision making and problem-solving, as they represent the basic input processes (Mayer, Salovey, & Caruso, 2005). The ability to effectively express emotions appears to follow a similar developmental progression. Fridlund, Ekman and Oster (1987) observed that the ability to recognize and display facial expressions gradually improves until around the age of 10 years, at which point children and adults are normally equally capable of encoding and decoding facial expressions displaying all major emotion categories.

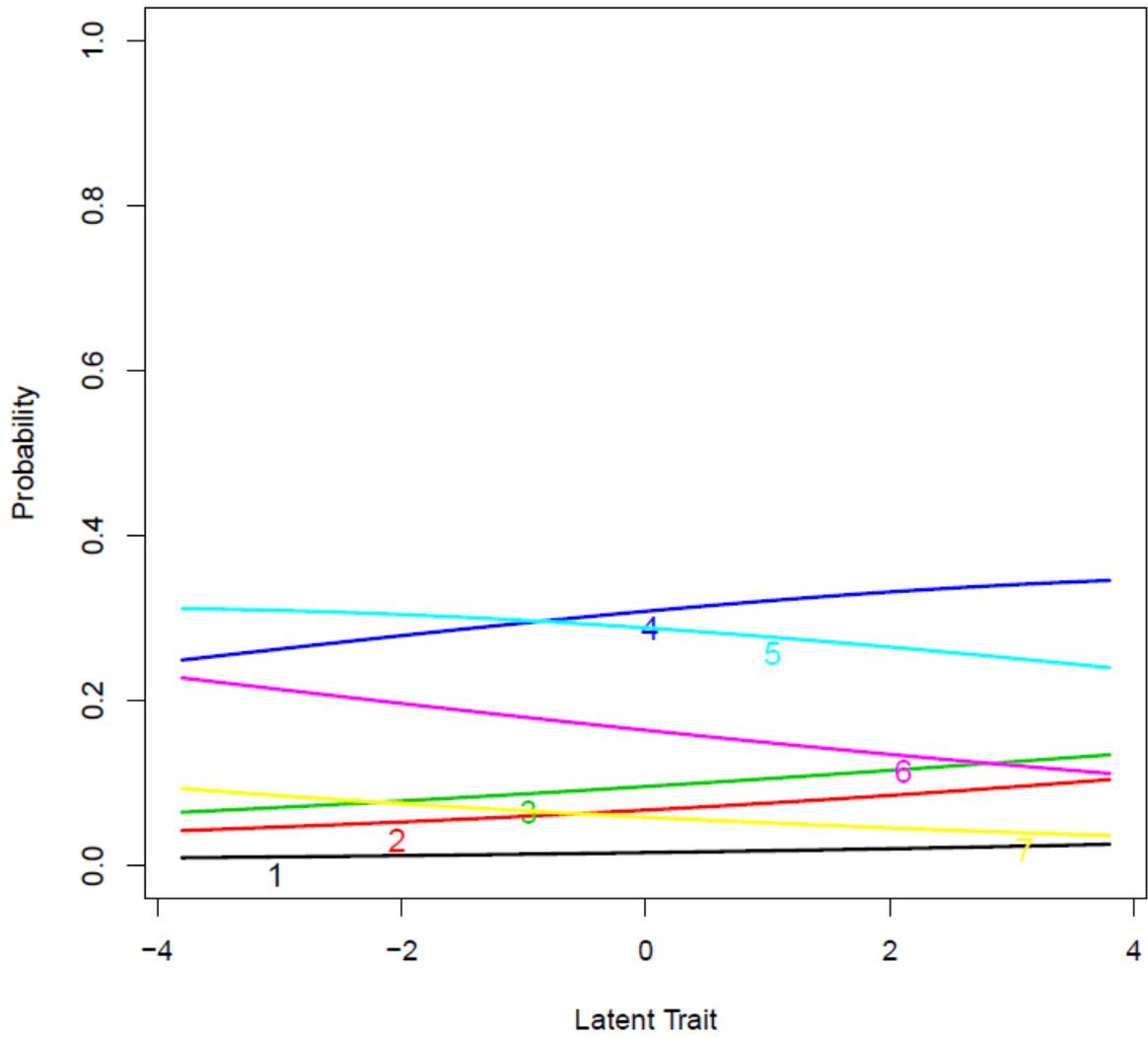
The use of emotional information to facilitate thought: concerns the influence of emotions on cognition and describes emotional events that assist intellectual processing. This branch entails both the capacity of emotions to assist thinking as well as the generation and optimal utilisation of these emotions to enhance reasoning, problem solving and planning (Mayer et al., 2005).

Emotional reasoning and understanding: relates to cognitions about emotions and building a knowledge base of emotional information and experiences which can be accessed for intelligent action. This branch comprises the capacity to analyse emotions, appreciate their probable trends over time, and understand their outcomes (Mayer et al., 1999). The most fundamental competency at this level is the ability to label emotions with words and to recognise the relationships among them. As this ability develops, the individual is able to recognise groupings of emotions (Ortony, 1990), what emotions convey about relationships, and the ways in which emotions can combine.

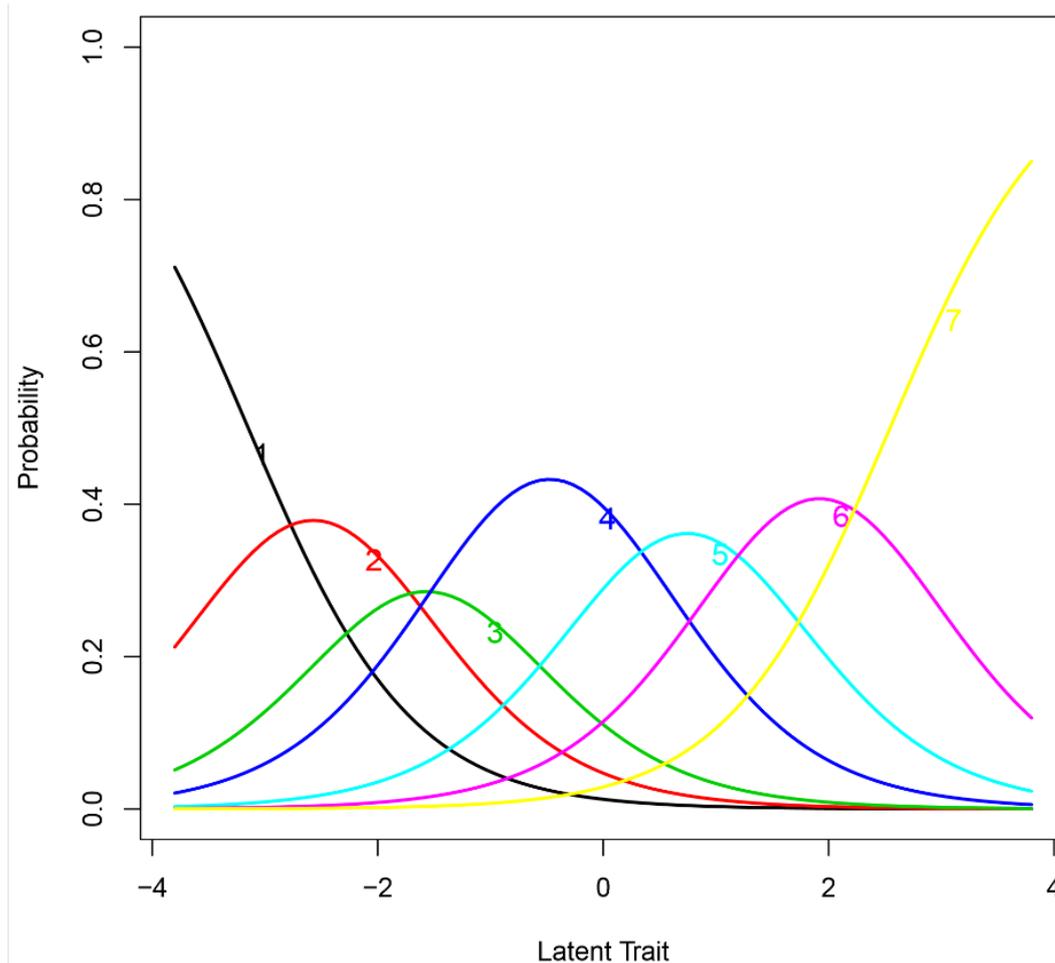
Emotional self-management: encompasses the management of emotion and Mayer and colleagues (2004) argue that it is integrally involved within the individual's personality such that emotions are managed in the context of the individual's goals, self-knowledge, and social awareness. At higher levels of consciousness, emotional construction involves more intentional, extended attempts to understand, define and optimise one's own and others emotional state.

IRT Analysis

Initial analysis of the data utilised the IRT process, that involved fitting a graded response model to each scales (each Personality and EI sub-scale) questions then producing a characteristic response curve for each question. An initial pool of 78 EI questions and 226 FFM model of personality items were subjected to IRT analysis, with examination of the items response curve 114 personality items were identified as not providing adequate spread of responses, or responses consistent with estimates of the trait being assessed. An example of a poorly (and removed from further analysis) performing item appears below.



This plots show the probability of a survey participant giving a response from 1 - 7, based on the strength of the latent trait (i.e. a respondent who scores high on a latent trait, should have a high probability of choosing a higher score on the item).



As can be seen in the above example, the responses for the item we can see a clear distribution in the response probabilities, such that people who are score between -4 and -2 on the latent trait are very unlikely to give a 7 for this question.

Confirmatory Factor Analysis

After the initial data screening for sufficient item face validity, preciseness (IRT) and the corresponding reduction in items numbers Confirmatory Factor Analysis (CFA) was conducted. This statistical technique produces simultaneous analyses of all variables in a model are examined to explore whether the model is consistent with the data (i.e. Do all the perception of emotion items, relate to all the other items, in a sensible, trait-like manner). In order to establish whether or not the survey instrument captures both the Five Factor Model of Personality and Four Factor model of EI. We conducted two separate CFA's, to test the hypotheses that the CFA's will replicate the FFM of Personality and Four Factor Model of EI respectively. Standard

CFA fit statistics were interpreted to assess the extent to which each of the above two models is an adequate representation of the data collected. To show that the Instrument does indeed reflect the two theoretical constructs the instrument was designed to assess (EI and Personality).

To determine the adequacy of “fit”, as an index of construct validity, we utilised the root mean square error of approximation (RMSEA), the Comparative Fit Index (CFI), the Standardized Root Mean Square Residual (SRMR), and the Normed Fit Index (NFI). These fit statistic uses the population discrepancy function (F) as a measure of model adequacy, but adjusts this function for the effects of model complexity. A perfect fit would see RMSEA = 0.00. Browne and Cudeck (1989) suggest that a RMSEA of 0.05 or less indicates a close fit, while a RMSEA of between 0.05 and 0.08 is an acceptable error of approximation.

Table 1: CFA “fit” statistics for Personality

CFI	SRMR	TLI (NFI)	RMSEA
0.909	0.092	0.908	0.075

Analysis of CFA for Personality: The CFI value falls marginally above 0.9. A CFI Above 0.9 is considered to indicate good model fit. Absolute close-fit values $\leq .08$ for RMSEA and SRMR and incremental close-fit values (TLI/NFI) $> .95$ are considered satisfactory for determining good model fit. In short, these “fit”: indices suggest that our FFM of Personality questions do indeed model the five factors of personality the test is designed to assess.

Table 2: CFA “fit” statistics for Emotional Intelligence

CFI	SRMR	TLI (NFI)	RMSEA
0.925	0.082	0.920	0.068

Analysis of CFA for Emotional Intelligence: Again, the CFI value falls marginally above 0.9. A CFI Above 0.9 is considered to indicate good model fit. Absolute close-fit values $\leq .08$ for RMSEA and SRMR and incremental close-fit values (TLI/NFI) $> .95$ are considered satisfactory for determining good model fit. In short, these “fit” indices suggest that our Emotional Intelligence questions ‘fit’ the four factor model of Emotional Intelligence that the test was designed to assess.

Reliability Analysis

A final assessment of the reliability of the TALY measure of EI and Personality was conducted utilising the commonly applied measure of “internal consistency”; Cronbach’s alpha. Cronbach’s alpha provides an estimate of how consistently people respond to closely related items. This measure of internal reliability, concerns how repeatable the TALY instruments measurement of Personality and Emotional Intelligence is. Cronbach’s Alpha is calculated through calculating the inter-item correlations within a sub-scale (e.g., Neuroticism), and averaging them to identify how well the measure the same latent construct (Cronbach, Nunnally & Bernstein, 1994; Kline, 2000). As such, Cronbach’s Alpha therefore provides a score that can range from 0 to 1. With regards to levels of adequate internal consistency, a score of 0.7 or more is an indication of acceptable internal consistency (Kline, 2000); with anything score above 0.9 considered to be excellent.

Table 3: Cronbach’s Alpha for Personality and Emotional Intelligence

Dimension	Cronbach’s Alpha
Neuroticism	0.95
Extraversion	0.96
Openness	0.95
Agreeableness	0.94
Conscientiousness	0.95
Perceiving and Expressing Emotions	0.75
Harnessing Emotions	0.81

Managing and Controlling Emotions	0.82
Understanding Emotions	0.84

As can be seen from inspection of the values contained in Table 3, the internal reliability, or how consistent people rate themselves on similar items, range from acceptable-excellent internal reliability values.

Conclusion

In January 2016, the team at TALY decided that in order to keep up with the evolving needs of Australian organisations, TALY needed to update and refine its current Five Factor Personality Instrument and team it with a bespoke measure of Emotional Intelligence. This decision led to a large new norming study, the results of which are reported in the current White Paper. The results indicated that in line with expectations, the new TALY instrument provides a 1) Valid, assessment of the Five Factor model of Personality and Four Factor model of Emotional Intelligence. Further, the updated assessment provides a 2) Reliable assessment of these important individual differences metrics. These results suggest that current and future TALY clients can be extremely confident that the measure TALY delivers, will provide valid assessments of individual and team levels of Emotional Intelligence and Personality, and that these indicators can be reliably measured over time.