

Using personality dimensions for vocational education:

Evaluating their effectiveness for predicting successful training outcomes

Abstract

The present study investigated the relationship between apprentices' five factor model (FFM) personality traits and success in completing training in the VET sector. The sample comprised (415 males and 29 female apprentices) from various trades across Australia. Personality traits were measured using a pencil and paper 20 item version of the international item pool test (IPIP) Goldberg.L, Johnson.J, Eber.H, Hogan.R, Ashton.M, Cloninger. R, Gough.H, (2006). We found that across all apprentice groups, age, location, year of apprenticeship, and highest level of education were likely to impact on an individual's personality traits. The implications of these findings indicate that personality shares a tenuous link between demographic variables to an apprentice's actions and behaviours in the workplace. These results provide an aspect of apprentices characteristic traits which will help make informed choices for strategies to manage them.

Note

This paper explains personality from an introductory level. Its aim is to give vocational educators an overview of the personality dimensions used in the field of psychology. Its

purpose is to inform those in the VET sector and, to give a practical application for those dimensions for industry when formulating strategies for policy. The vocational education and training (VET) sector will be discussed in the Australian context with apprentices being the sample group used for the study.

Using Personality Dimensions for Vocational Education: Evaluating their effectiveness for predicting successful training outcomes

Jobs of the future will require more skills; therefore the actions and behaviours of people will be the focus of an employer's requirements for those they employ. This study is about bringing the broader theoretical framework of personality to the VET context to examine what possibilities may exist with the dimensions used.

Understanding personality will assist knowing why individuals may have successful outcomes. Therefore, one of the things personality traits are likely to predict, is the process of how think which in turn leads to the behaviours we display. For example, working in a customer focused or service environment, i.e.; hairdressing, maintenance electrician etc., many issues arise daily that are sometimes unexpected. It is how those issues are dealt with, will determine how successful the customers' issues will be resolved. Personality has been successfully studied in many settings, employment, education, and sport.

In an employment selection setting using personality, social desirability, cognitive ability and a survey of work styles, correlations were found between some of the personality factors and the survey of work styles scales. Some personality self-report measures used by organisations (i.e.: government and management) for employment include the Minnesota Multiphase Personality Inventory (MMPI) or the RAISEC/Holland tests. These measures provide valuable insights into the suitability of individuals to the types of occupations they prefer and job performance, Personality measures in the VET sector have been used for job selection by

larger organizations to recruit apprentices. This leads to potentially being able to use these measures for off the job VET training for likely academic outcomes for this cohort (Ashton, M. 1998), (Hurtz.G, Donovan.J, 2000), (Barrick.M, & Mount.M, 1991), (Judge.T, Higgins.C,Thoresen. C, Barrick.1999).Using personality for the vocational sector will enhance educational and training outcomes. This additional insight into individuals' characteristic traits can assist VET training for likely intervention strategies or teaching delivery methods to use to a cohort.

Personality has also been in education in relation to gender differences in school subject choices in pre university education .They found several associations between personality characteristics and students' subject choices and gender remained an important predictor of the students' choices (Korpershoek, Kuyper, Van der Werf, 2012).

In sport, athlete coping strategies could be predicted by personality test scores. Also cardiac output and peripheral vascular resistance in a moderately stressful (non-related) situation may be sufficient to predict personality traits and sport-related coping (Allen.M, Frings.D, Hunter.S, 2012).

A literature search was conducted to cite articles after 2007 with computerised databases (Web of Knowledge, VOCED, ERIC, and Scopus) with search strings, personality traits and vocational education and apprentices (in the Australian context). To the author's knowledge, personality dimensions have not being applied in the VET context to this cohort with published outcomes to this point in time. The only examples where personality has been applied in this setting with this cohort are by corporations such as gas and mining companies (Origin), (BHP) and energy infrastructure providers (Jemena). The reason they applied personality measure was for recruitment and selection of staff. The data collected from these organisations in house evaluations are not published or open to peer review and do not represent the broader population used for this study

Statistics tell us of the high numbers of apprentices not completing the apprenticeship (Commonwealth of Australia, 2012) and qualitative evidence provides some explanation for why they leave (Harris, Simons, Bridge, Bone, Symons, Clayton, Pope, Cummins, Blom, 2001), (Snell, Hart, 2007), (Commonwealth of Australia, 2012). Exploring the personality traits of apprentices by quantitative methods seeks to collect evidence and understand if there is a link between the causes of behaviours and actions given for not completing training.

The aim of this paper was to investigate the dimensions of personality and explore the way that they affect the VET sector, particularly apprentices in their training. The rationale behind this paper is to inform researchers in the VET sector of the practical applications of personality dimensions for the different apprentice types.

The other purpose of this paper is to explore what personality is a good match to a job an individual chooses. The findings from this paper will add to the research known about this cohort to better serve apprentices needs especially for stakeholders of apprentices.

To address these aims of this paper, the first section of this defines what personality is together with its history and an overview of the IPIP self-report instrument. The following sections outline the method including a description of the participants, demographic variables and measures. A summary of the statistical analysis that was carried out is described. Finally, in the discussion and conclusion section we consider how reliable the IPIP is to apprentice's personality and to see what strength the subscales of the IPIP has with this cohort. This investigation will clarify what influence a demographic variable (e.g.: age or highest level of education) has with particular dimensions of personality and if it influences the behaviours of this cohort.

This present study builds on the work of previous research by the work of Harris, et al, (2001), Snell, Hart, (2007), Commonwealth of Australia, (2012), to help explore unresolved

issues in this area of attrition and completion amongst apprentices in the trades. The work of these authors discussed and identified factors contributing to the retention and non – completion of apprentices and traineeships. They also examined interventions that could be used to enhance retention and contribute to increased completion of apprenticeships and traineeships.

Personality and Skills

Having a skilled workforce improves quality and productivity outcomes for the industry and nation. Developing the right people for an organisation is always a challenge when so many variables impact on the functioning of a workforce. Recognising individual's behaviours and actions allows strategies and informed decisions to be made and what directions to take to lead a workforce to productive outcomes. Personality is a method of doing this especially for an employer who employs apprentices. Nofie & Roobins (2007) found that using the big five personality traits they were able to forecast academic outcomes or more specifically the traits (openness) that predicted Standardised assessment tasks (SAT) and conscientiousness, that anticipated grade point average in American high school and college students. Roberts, Brent, Caspi, Avshalom; Moffitt, Terrie (2003) investigated the work experiences and personality development in young adulthood. Some of their findings indicated that work experiences were related to changes in personality traits from age 18 to 26. Research conducted between the big five personality traits and conflict, and facilitation between work and family roles by Wayne, Musisca, Fleeson (2004), found that the personality traits extraversion was related to greater facilitation between roles, neuroticism was related to greater conflict, and conscientiousness was related to less conflict. The implications conducting research using personality traits for predicting work and training outcomes in VET can be beneficial for all stakeholders involved in the process of managing apprentices. For example, if one of the

selection methods for employing individuals used personality traits across more organisations than is being presently used, it will impact in a positive way the likelihood of lifting the rate of apprentice completions across the trades, save money spent in training budgets for employing apprentices, and increase a company's human capital.

What is Personality?

Personality is a difficult concept to define because of the many viewpoints there are as to what is perceived to affect the behaviours and actions of individuals. Many commentators (Burton, Weston, Kowalski, 2009); (Hogan, 1998); (Personality and Spirituality, n.d), (Psychology.about.com, n.d), have defined personality in many different ways. Recognising the conceptual understanding of personality allows us to understand the thoughts, feelings, and motives behind the way we act as we do in our everyday activities. This insight allows us to benefit who we work with, the friends and alliances we keep, and the jobs we do.

History of Personality Theories

In the twentieth century there have been a number of theories that have evolved; some include cognitive social theories, psychodynamic theories, and trait theories of which the most widely used is the FFM. The main one that has gained acceptance amongst personality researchers is trait theory.

Most research in personality is conducted with the five factor model although others are also used like the Myers – Briggs test (<http://www.myersbriggs.org/my-mbti-personality-type/mbti-basics/>) which is popular in the business community because it is simple to interpret, informative, and aligns with the type of information required by management for staff they employ.

The five factor model (FFM) has been administered to a diverse range of studies, for example adolescent personality (Baker, Victor, Chambers, Halverson, 2004), use on the internet (Buchanan, Johnson, Goldberg, 2005), uncertified absence from work (Darviri & Woods, 2006), and motives for drinking (Theakston, Stewart, Dawson, Knowlden-Loewen, Lehman, 2004). To the author's knowledge, at this point, it has not been applied in the VET sector and it is not known whether the 20 item IPIP self-report instrument has internal reliability or predictive validity for this cohort.

In the workplace there is a theory that the apprentice is in a social learning community of practice environment (Wenger, 2000). Bandura developed the theoretical concept of reciprocal determinism where he suggested that "environment causes behaviour, but behaviour causes environment as well. The world and a person's behaviour cause each other" (Boeree, 2006). These theories help us understand human behaviour of individuals in various situations although they do not give us a complete picture of an apprentice's behaviour in the workplace, it allows us to design what strategies we may want to adopt, or interventions we may choose to use to negate aspects of unproductive work activities amongst individuals

While there may be critics (Block.J. 1985) who consider the five factor model to have some flaws, it is the most widely recognised measure that is known amongst people in the psychology field and that is why it is being used for this study. It also provides a common language for researchers to understand the results of this measure.

Dimensions of the International Item Pool Personality Test (IPIP)

Many psychologists have agreed that personality can be summarised to five traits (Burton, Weston, Kowalski, 2009), and are known as the five factor model (FFM) or colloquially as

the “big five”. The factors are Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to change. They are described as follows:

Extraversion: reflects the extent to which people are warm, energetic, gregarious, assertive, active, and high in positive emotions. *Openness*: reflects the extent to which people are open to change, new ideas, different values and their own feelings, and the extent to which they enjoy ideas and aesthetic pursuits. *Conscientiousness*: reflects the extent to which people seek order and are achievement focused, competent, dutiful, deliberate, and self-disciplined. *Agreeableness*: Reflects the extent which individuals are trusting, straightforward, altruistic, compliant, modest, and tender minded. *Neuroticism*: reflects the extent to which people are anxious, hostile, depressed, self-conscious, impulsive, and vulnerable. (McCrae & Sutin, p424, 2007)

The IPIP- FFM is a self-report questionnaire that will be used for this paper. It is derived from the larger parent 50 item measures (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, Gough, 2006). The IPIP – 20 is a measure of the FFM constructed of 20 items with four items that measure each of the five factor model traits with statements rated on a five point Likert scale. The format is in short phrases addressing one of the four factors in the questionnaire. Typical questions include “I am the life of the party” and “I don’t talk a lot”. Scores for each trait are obtained by summing the responses for the items on that scale.

To compare the results collected for this study a normative sample is usually used to verify the result. The IPIP 20 item questionnaire does not have published normative samples therefore; in the interim a second data collection was used. A normative sample will be calculated for this instrument from the parent IPIP – 50 norms at a later stage.

Method

Participants

The research sample $n = 446$, (415 males, mean age = 22.38 SD = 5.98 and 29 females, mean age = 22.86 SD = 7.53, 2 participants did not include their ages) from selected states across Australia, (Tasmania, and Western Australia were not surveyed).

Based on the recommendations of (Cavana, Delahaye, Sekaran, 2001, p278), 384 participants were needed to have good representative sampling of the target population which was 219,300 people aged 15–64 years who were employed as apprentices or trainees and part of the Australian Apprenticeship Scheme (ABS, 2012). The participants sampled for this study was 446, above the number required and appropriate for this research to obtain a significant result.

The survey was conducted between September and December 2010 across Australia. It was distributed to apprentices by the classroom teacher during class time.

Materials

The IPIP – 20 personality questionnaires were distributed to participants by the teacher in classroom time and took approximately 15 minutes to complete together with two other questionnaires, It was used together with two other questionnaires (Swinburne University Apprentice Skills Assessment (SUASA) (Pagnoccolo, 2012), and the Swinburne University Emotional Intelligence test (SUEIT) (Palmer & Stough, 2001), because of the brief time available by participants to do the survey. The SUASA and the SUEIT will not be described in this paper since they were not analysed with the IPIP-20 instrument.

Demographic variables

In the survey, participants were asked a series of questions about themselves which included age, gender, highest level of education prior to entering the apprenticeship, year of training

,type of training (i.e.; block or day release) type of apprenticeship (i.e.: electrical, hairdressing, cookery), location (metropolitan or regional) and state they come from in Australia.

Measures

The 20 item IPIP- FFM (Goldberg, Johnson, Eber, Hogan, Ashton, Cloninger, Gough, 2006) short form measure was used because of the brief time available by participants to do the survey.

The mini 20 item IPIP- FFM contained five factors (Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to change). Each factor had four items.

Once questionnaires were collected, data was extracted using a Cannon Teleform scanner and analysed using SPSS version 19.

Two calculations were performed to analyse the data, reliability testing and correlation analysis, so the objectives of this study could be answered. Descriptive statistics were obtained to understand the population sample being tested and normative samples used for comparison.

Analyses

A second survey was conducted in 2012 with a smaller research sample of 220 participants (183 males, mean age = 22.46 SD = 5.29 and 37 females, mean age = 21.86 SD = 4.94) from two colleges in Melbourne. This second data collection was only used to compare with the first research sample $n = 446$ and to ensure there was consistent reliability with the results and was not included in the findings.

Procedure

Cluster sampling was used for this study by surveying all types of apprentices from the classrooms of selected public and private training colleges from around Australia for the purpose of testing the IPIP questionnaire. It was conducted this way on this cohort to see what kind of common responses arise and use to results as a baseline for further research with this research sample.

Informed consent was asked from those participating by a signed paper attached to the survey instrument. Ethical clearance was sort prior to commencing this study which meant that participants under the age of 18 were not asked to participate and therefore not included in the data collection.

Results

Descriptive and inferential statistics of all the personality factors are shown in the summary statistics tables under the sub headings of this section of the paper. The IPIP has been found to have consistency with the results derived from the instrument because the various items measured different constructs and thus delivered consistent scores in the data analysis and interpretation. This is seen by the coefficient alpha (α) displayed in Table 2. The measure also demonstrated had predictive validity demonstrating the ability to predict the results of an analysis of the data. The influence the personality factors have to an apprentice's behaviour is supported by the correlations the dimensions have with each other in Table 3.

The research sample

Table 1 summarises the research sample demographics of the type of participants (n = 446) where the majority of the data was collected from across Australia.

Table 1

The demographic research sample

Demographic	Group	%
Age	20-24	50.20
Gender	male	92.80
RTO	public	91
Location	metropolitan	93.3
Year of Apprenticeship	first year	34.8
Highest level of education	Year 12	42.4
Training Type	Day	51
Type of Apprenticeship	The electrical and electronic trades	42.3

Descriptive Statistics

The summary statistics for the five factor model are displayed in Table 2. This includes the internal consistency reliability (coefficient alpha α) for each subscale. Extraversion was the subscale with the highest reliability ($\alpha = 0.648$).

Table 2

Descriptive Statistics for Five Factor Model (IPIP) Traits for all Apprentices in this Study

IPIP FFM Trait	Mean	SD	Cronbach's α
Extraversion	13.46	3.9	0.65
Agreeableness	13.20	3.81	0.56
Conscientiousness	13.51	3.52	0.49
Neuroticism	10.22	3.4	0.36
Openness	13.26	3.79	0.61

Measures of effect size

The measure of the association between the subscales was significantly correlated and presented in Table 3. The highest positive correlation between the scales was conscientiousness and agreeableness (scale = .66).

Table 3

Measures of effect size

IPIP FFM Trait	Extraversion	Agreeableness	Conscientiousness	Neuroticism
Extraversion	–			
Agreeableness	.56	–		
Conscientiousness	.54	.66	–	
Neuroticism	.30	.33	.26	–

Openness	.51	.59	.58	.23
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Correlation was found between the scales consistent with past research (Carver& Scheier 2008), (Burton, Weston, Kowalski, (2009).

Significance tests

Independent samples t test

An independent sample t test was used to compare the FFM constructs derived from the IPIP-20 self-report instrument to the demographic variable collected in the survey. Levene's test for equality of variance between groups was not significant for the demographic variables at $p > 0.05$, Gender RTO (public and private), and apprentice training type (Electrical and plumbing trades).

The demographic variables that showed a statistical significant difference between the groups for the particular FFM constructs is presented in table 4. The effect size (r) is also given to show the measure of the strength of the relationship between the two groups and Cohen's d to indicate the amount of difference between the two groups in standard deviation units.

Table 4

Independent sample t test results

Demographic	Construct	T	Df	Cohens d	Effect size r)
Location (metro – regional)	extraversion	-.82	425	.079	.04
	openness	-.27	418	.03	.01
Year of Apprentice	openness	.012	285	.0014	.0007

(1 st year– 2 nd year)					
Highest level of education. (year 12 – TAFE Certificate)	neuroticism	255	0.156	.02	.01

One way between groups test (ANOVA)

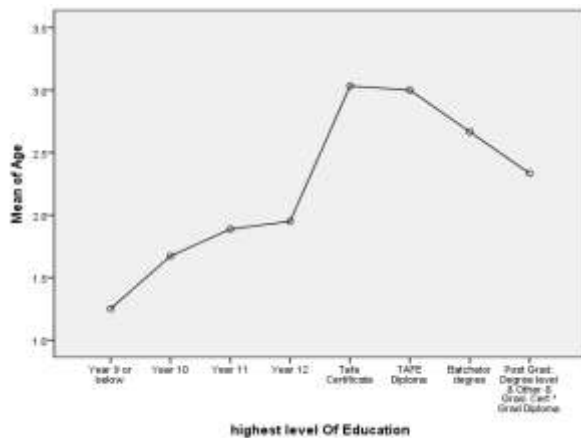
A one way between groups analysis of variance (ANOVA) was conducted to explore the impact of highest level of education with age, gender, RTO (private or public), location, year of apprenticeship, and apprentice training type as measured by the IPIP-20 self-report measure.

Amongst all the demographic variables, age was the only one that showed a significant difference. The Levene statistic was not significant for the age demographic, $F(7,434) = 4.921$, $p = 0.000$ and thus homogeneity of variance was not violated. Highest level of education was divided into 8 groups (year 9, 10,11,12,post grad diploma and certificate, bachelor degree, TAFE diploma, TAFE certificate).There was a statistically significant difference at $p < .05$ in two groups of highest level of education, more specifically those with a TAFE certificate or diploma. .

The graph in figure 1 presents the relation between highest level of education and age. The age levels are group 1 = 15 – 19, group 2 = 20 – 24, group 3 = 25 – 29, group 4 = 30 – 34).

Figure 1

One way ANOVA between age and highest level of education



Discussion

The summary of results as given in table 1, revealed the sample of apprentices that participated in the survey were mainly male, between the age of 20 – 24, and had year 12 as their highest level of education prior to commencing the apprenticeship. They were enrolled in the electrical and electronic trades doing the first year of their course by day release training in a public metropolitan college. The IPIP questionnaire used for the survey had internal reliability as indicated by the alpha (α) coefficient for each of the subscales given in Table 2. There was a relationship between the personality scales as presented in Table 3 with conscientiousness and agreeableness having the highest positive correlation.

Statistical differences were seen between the demographic variables of location, year of apprenticeship, and highest level of education and various personality constructs shown in Table 4. It must be noted that this statistical difference, as measured by Cohen's and the effect size was small.

The research sample showed that highest level of education (TAFE certificate and TAFE diploma) had some impact with age as indicated by figure 1. It must be noted that these two groups represented approximately 10% of the research sample in this study.

These findings indicate that the IPIP-20 personality measure used for this cohort had internal reliability including a positive association between the subscales with conscientiousness and agreeableness having the highest correlation. The analysis of the data showed that there were statistical differences between some of demographic variables (location, year of apprenticeship, and highest level of education) with various personality constructs (extraversion, openness, and neuroticism). There was a statistical difference between the impact the demographic variables of highest level of education (TAFE certificate and diploma) had with age.

The limitation this study had was the small personality item measure used. The benefit for using it revealed aspects of the personality dimensions that can lead to further investigation with facets of the subscales.

Conclusion

The findings indicate that the FFM personality constructs has a tenuous link to the demographic variables which can influence an apprentice's behaviours in the workplace.

It must be acknowledged that further research is needed to explore the strength of the association an apprentices' behaviours have with aspects of these personality constructs and the VET sector (i.e.; on and off the job training). The practical implications of this study builds on the knowledge we know so far about apprentice's actions and behaviours in attrition and retention statistics.

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