


Job applicants' attitudes towards cognitive ability and personality testing

**Authors:**

Rachelle Visser¹
Pieter Schaap¹ 

Affiliations:

¹Department of Human Resources Management, University of Pretoria, South Africa

Corresponding author:

Pieter Schaap,
pieter.schaap@up.ac.za

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Orientation: Growing research has shown that not only test validity considerations but also the test-taking attitudes of job applicants are important in the choice of selection instruments as these can contribute to test performance and the perceived fairness of the selection process.

Research purpose: The main purpose of this study was to determine the test-taking attitudes of a diverse group of job applicants towards personality and cognitive ability tests administered conjointly online as part of employee selection in a financial services company in South Africa.

Motivation for the study: If users understand how job applicants view specific test types, they will know which assessments are perceived more negatively and how this situation can potentially be rectified.

Research design, approach and method: A non-experimental and cross-sectional survey design was used. An adapted version of the Test Attitude Survey was used to determine job applicants' attitudes towards tests administered online as part of an employee selection process. The sample consisted of a group of job applicants ($N = 160$) who were diverse in terms of ethnicity and age and the educational level applicable for sales and supervisory positions.

Main findings: On average, the job applicants responded equally positively to the cognitive ability and personality tests. The African job applicants had a statistically significantly more positive attitude towards the tests than the other groups, and candidates applying for the sales position viewed the cognitive ability tests significantly less positively than the personality test.

Practical and managerial implications: The choice of selection tests used in combination as well as the testing conditions that are applicable should be considered carefully as they are the factors that can potentially influence the test-taking motivation and general test-taking attitudes of job applicants.

Contribution: This study consolidated the research findings on the determinants of attitudinal responses to cognitive ability and personality testing and produced valuable empirical findings on job applicants' attitudes towards both test types when administered conjointly.

Introduction

The sensible application of psychological assessment tools could play an important role in the transformation of organisations, in particular organisations in post-apartheid South Africa (Donald, Thatcher & Milner, 2014). Despite the finding that occupational assessment has the potential to provide valid and reliable performance predictions in an occupational setting, participants' perceptions may still adversely impact the results (McCarthy & Goffin, 2003). Variables, such as individuals' attitudes towards an assessment process, should be considered in order to come to an understanding of individual performance levels in assessments (Chu, Guo & Leighton, 2014). Many research studies support the notion that attitude has a profound impact on the performance of an individual in a wide variety of assessment tasks (Schmitt, 2013; Smith, 1997). Gilliland and Steiner (2012) have identified some broad implications of positive reactions to testing, for instance, positive reactions can impact significantly the attractiveness of a job and an organisation and result in positive intentions regarding the job offer.

The assessments chosen for inclusion in a selection battery may impact the job applicants' reactions to the selection process as a whole. In general, practitioners and users of psychometric tools agree that the use of a combination of different assessment types serves the purpose of giving the user a more objective view of candidates' abilities and preferences (Saville, Nyfield, McCarthy & Gibbons, 1997). Numerous studies and meta-analyses have provided evidence of the validity of cognitive and personality tests as predictors of job performance. Although personality tests have low validity compared with cognitive ability tests, evidence has shown that when these

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are used in combination, personality tests have significant incremental validity (Schmitt, 2013). In addition, cognitive ability and personality tests are popular choices for inclusion in selection processes as these measures have shown remarkable validity generalisation and cost-effectiveness (Gilliland & Steiner, 2012). However, test takers' attitudes and perceptions may affect the validity of selection tools (Schmitt, 2013). Research has shown that job applicants generally evaluate cognitive ability and personality tests as less favourable than other competing selection tools (e.g. interviews and work samples) (Anderson, Salgado & Hüsheger, 2010). If users understand how job applicants from diverse backgrounds view specific assessments and what potential impact their views could have on performance, they could get to know which assessments are perceived more negatively and how this perception could potentially be rectified. Evoking positive reactions to testing during the selection process holds promise for attracting and retaining qualified employees, in particular from underrepresented or previously disadvantaged groups (De Jong & Visser, 2000; Donald et al., 2014; Muchinsky, Kriek & Schreuder, 2002).

Research purpose

The main purpose of this study was to determine the attitudes of a diverse group of job applicants towards personality and cognitive ability tests administered conjointly in a supervised online test session as part of a selection process in a financial services company in South Africa. A secondary purpose of the study was to determine the effect of the group's demographics (representing the group's diversity) on the test-taking attitudes (TA) of the group.

In the following section, a background to TAs will be given, followed by relevant research questions that were formulated based on relevant literature that was studied.

Literature review

Theoretical background

The study of job applicants' attitudes towards testing forms part of a broad study field known as 'applicant reactions to tests', which entails a multitude of different theoretical perspectives. Although no single overarching theoretical framework has directed research, there has been substantial cross-referencing and integration of various models (Gilliland & Steiner, 2012; Hüsheger & Anderson, 2009).

Research on test-taking attitudinal and motivational components and their influence on test performance and test validity (Arvey, Strickland, Drauden & Martin, 1990; O'Neill, Goffin & Gellatly, 2012) is one of the recognised research streams relating to applicants' reactions to tests. Test attitude can be defined as the extent to which participants in assessments demonstrate focus, effort and diligence in completing the instrument (Arvey et al., 1990). Different aspects of TAs, such as test anxiety, motivation during tests, belief in tests, concentration and test ease during assessments, have been observed (Arvey et al., 1990).

A second well-known research stream that has a bearing on job applicants' reactions to selection practices is that of organisational justice (Gilliland, 1993). Organisational justice includes the concepts of procedural justice, interactional justice and distributive justice, which are considered central in promoting test fairness. The research issues tackled are job relatedness, test validity, equity, equality and communication about the assessment process and results (Donald et al., 2014). Gilliland's justice constructs (procedural and interactional justice) that promote test fairness have been shown to be related to test attitude constructs (e.g. motivation during tests, belief in tests) (McCarthy, Hrabluik & Jelley, 2009). Lievens, De Corte and Brysse (2003) have found that the attitudinal component known as belief in tests relates significantly to overall perceptions of the fairness of cognitive ability tests and personality tests. Research conducted by these authors shows that perceived job relatedness and test validity may positively influence test takers' belief in tests, resulting in a positive attitude.

According to Gilliland and Steiner (2012) and Nikolaou, Bauer and Truxillo (2015), social psychological theoretical models help explain reactions to tests. These models suggest that a job applicant's attitude towards a test may be influenced by the job applicant's perception of the level of congruence between his or her own identity and what the organisation stands for in terms of culture, values and beliefs. Where congruence exists with respect to valued justice principles, the applicant's attitude towards selection measures may be swayed to become more positive.

Ployhart and Harold (2004) have developed the Applicant Attribution-Reaction Theory (AART), a theory which integrates attribution theory (Weiner, 1985), the selection justice model (Gilliland, 1993) and the test attitude model (Arvey et al., 1990). The AART suggests that blatant mismatches between situational perceptions and expectations of fair treatment act as attribution triggers, leading to increased awareness of the violation of justice rules and standards of conduct in testing situations. In terms of the AART, unfavourable testing experiences may trigger a critical attitude towards tests and possibly counter-productive behavioural reactions such as withdrawal or litigation.

A fundamental assumption that applies to test attitude research is that self-interest consciously and unconsciously drives attempts to maximise the likelihood of favourable outcomes, resulting in positive or negative reactions depending on the individual's performance and the perceived fairness of the process. Testing procedures tend to be seen as more fair if they are consistent, accurate, ethical, free from bias, open to challenge and created to provide opportunity for input (Gilliland, 2008). Gilliland and Steiner (2012, p. 633) have formulated justice rules that contribute to the perceived fairness of a selection process. These rules are job relatedness, opportunity to perform, consistence of administration, reconsideration opportunity, selection information, feedback timeliness, honesty, interpersonal effectiveness of administrator, two-way communication

and propriety of questions. A detailed discussion of each of the rules in this article is not justified because of limited space; therefore, only the rules and supporting research evidence specific to standardised proctored testing of cognitive ability and personality tests will be further discussed. Meta-analytical studies have demonstrated that job applicants are inclined to react only moderately favourably to cognitive ability and personality tests but more favourably to work sample and interview selection techniques (Anderson et al., 2010). This represents a challenge as these two off-the-shelf tests (cognitive ability and personality tests) are popular choices for inclusion in a selection battery because of their generalised validity evidence for predicting performance with respect to many jobs and because of their relative cost-effectiveness (Gilliland & Steiner, 2012). Furthermore, there is a notable tendency to rate personality tests less favourably than cognitive ability tests (Anderson et al., 2010; Hausknecht, Day & Thomas, 2004). Therefore, understanding the determinants of negative or positive reactions towards personality and cognitive ability tests could be considered important as these reactions could influence TAs in specific contexts.

Determinants of personality and cognitive ability test-taking attitudes

The 'opportunity to perform' rule of Gilliland and Steiner (2012, p. 633), which refers to the opportunity to demonstrate the required competencies within a testing and selection context, is also applicable to cognitive and personality tests. According to Hausknecht et al. (2004), opportunity to perform correlates with test-taking motivation (TM) ($r = 0.32$). For instance, question steering (ability to 'fake' a response) in personality tests may elicit positive or negative responses depending on the extent to which the applicant is able to identify the job profile requirements in the items. According to Van Vianen, Taris, Scholten and Schinkel (2004), personality tests are likely to be perceived as less fair by job applicants when the responses needed to obtain a favourable test outcome is less transparent (e.g. forced-choice-item format as opposed to a Likert format). Job applicants react favourably to tests in which their perceived and actual performance is good, and the opposite is true if they perform badly (Whitman, Kraus & Van Rooy, 2014). Positively worded warnings not to fake on tests (e.g. emphasising the advantages of responding honestly) increase test takers' motivation, whereas negative warnings (e.g. emphasising the negative outcomes of dishonesty) increase test takers' levels of anxiety, resulting in inaccurate responses (Burns, Fillipowski, Morris & Shoda, 2015). Research has shown that anxiety has a differential impact on applicants' cognitive test performance within a personnel selection context (Proost, Derous, Schreurs, Hagtvét & De Witte, 2008). Meta-analyses have shown that test performance and test anxiety are negatively related ($r = -0.31$), but causality is unclear. Surprisingly though, Lievens et al. (2003) have found that test anxiety fails to predict test fairness perceptions. However, Hausknecht et al. (2004) have found test anxiety to be related to negative TAs.

The justice rule of 'propriety of questions' formulated by Gilliland and Steiner (2012) refers to invasive, inappropriate and biased questions that infringe an applicant's privacy. This rule may be more of an issue in structured personality tests than in cognitive ability tests. Inappropriate questioning is associated with less job relatedness and produces lower justice, validity perceptions and fairness reactions, which are likely to have an impact on the applicant's belief in tests (Bauer et al., 2006; Gilliland & Steiner, 2012, p. 633). Perceptions of question invasiveness have shown to be strongly (and negatively) related to perceptions of fairness (Gilliland, 1993).

'Providing selection information and explanations' to job applicants forms part of information justice rules (Gilliland & Steiner, 2012, p. 633). This rule refers to the job relatedness of the test, the validity of the test, the procedure to be followed, the way the test will be scored and the length of time it will take, the format of the test and the expected processes and timelines for feedback (Gilliland & Steiner, 2012; Ryan & Huth, 2008). Although research findings are inconsistent (Lahuis, Perreault & Ferguson, 2003; Rolland & Steiner, 2007), Truxillo, Bodner, Bertolino, Bauer and Yonce (2009) have found that explanations affect performance in cognitive ability tests as they have a mediating effect on the motivation of the applicants taking the test. A further finding of their study is that selection information has a stronger effect on reactions to personality tests than to cognitive ability tests because of personality tests showing less job relatedness, lower transparency and controllability on the part of the applicant.

'The interpersonal effectiveness of the test administrator' is another justice rule that relates to 'the degree to which applicants are treated with warmth and respect' (Gilliland & Steiner, 2012, p. 633). Interpersonal effectiveness is a factor applicants cite often as one that makes selection processes as a whole fair or unfair. However, overall research findings demonstrate less consistent results relating to the influence of interpersonal effectiveness on test-taker reactions. This may especially be true in standardised testing situations where interpersonal contact may be limited because of the nature of the testing circumstances (Gilliland & Steiner, 2012). Although no research that has explored the differential effect of interpersonal treatment on TAs towards personality and cognitive tests could be identified, in a meta-analysis conducted by Hausknecht et al. (2004) interpersonal treatment shows a strong average effect size ($r = 0.34$) towards testing attitudes in general.

According to Zibarras and Patterson (2015, p. 333), 'job relatedness' is considered the procedural justice principle that has the greatest influence on overall fairness perceptions compared to any other characteristics of a selection method. Steiner and Gilliland (1996) argue that people implicitly judge widely used testing techniques to be valid, resulting in a favourable view of tests (belief in tests). Lievens et al. (2003) indicate a significant relation between the belief in tests and the perceived scientific value of cognitive ability tests but not

of personality tests. However, belief in tests shows a significantly positive relationship with job relatedness in personality tests. Furthermore, reactions towards cognitive ability tests containing concrete items are more positive than are reactions towards tests containing abstract items (Gilliland & Steiner, 2012).

The findings of studies about the effect of demographic variables on TAs are generally mixed (Rosse, Miller & Stecher, 1994). The effect of race on cognitive ability test performance is found to be mediated partially by motivation: a portion of the difference in the test performance of African and white people may be explained through differences in TM (Whitman et al., 2014). De Jong and Visser (2000) point out that black population groups are inclined to view personality tests as less fair than do white population groups. Rynes and Connerly (1993) have found that demographic variables are unrelated to job applicants' attitudes. Similarly, Hausknecht et al. (2004) in their meta-analytical study have found no significant relationship between applicants' perceptions of tests and personal characteristics, age, gender and ethnic background.

To date, studies have found that test takers' attitudinal reactions to a wide range of web-based administered tests are overwhelmingly positive. Online testing is no longer a novelty and many people are frequently exposed to tests on Internet portals in academic and employment settings (Anderson, 2003; Reynolds & Lin, 2003; Wiechmann & Ryan, 2003). This includes the online administration of personality and cognitive ability tests (Baron & Austin, 2000; Reynolds, Sinar & McClough, 2000). Konradt, Warszta and Ellwart (2013) point out that Gilliland's (1993) organisational justice rules for promoting positive job applicant reactions apply equally to online testing platforms. The key factors that influence job applicants' reactions to online testing are perceived to be efficiency and user-friendliness (e.g. system usability and speed), provision of information (e.g. tutorials and clear instructions), perceived process fairness (e.g. clarity about selection criteria) and the company's technological image on the Internet (i.e. job applicants' image of companies that use modern and progressive online testing systems for selection purposes).

To summarise, the theory suggests that job applicants' attitude (e.g. test anxiety, motivation during tests and belief in tests) towards cognitive ability and personality tests will most likely be affected by the perceived opportunity that the tests provide for optimal performance (Zibarras & Patterson, 2015), interpersonal effectiveness during testing (Schleicher, Venkataramani, Morgeson & Campion, 2006), explanations and selection information provided (Truxillo et al., 2009), question invasiveness (Nikolaou et al., 2015) and the efficiency and user-friendliness of an online test administration platform (Konradt et al., 2013). The favourability of testing situations may trigger a positive or negative attitude (according to attribution theory) towards tests, supported by the perceived congruence (according to social psychological models) between the applicants'

self-identity and the company's culture and values. Although research evidence generally points to a difference in job applicants' favourability rating of cognitive ability and personality tests, research carried out by Rosse et al. (1994) suggests that measures from the same category (e.g. psychological tests) applied conjointly may compensate for each other in terms of perceived relevance and fairness, resulting in job applicants reacting similarly to these measures (Rosse et al., 1994). In line with the findings of previous studies, it is argued that the experience of tests of a demographically diverse group of job applicants should affect TM and general TAs similarly irrespective of group membership. However, research findings to support this notion have been inconsistent.

The specific research questions that this study intends to answer with regard to personality and cognitive ability tests administered online under supervision as part of the relevant financial services company's selection process are the following:

- Question 1: What are the job applicants' attitudinal responses to supervised online personality and cognitive ability tests administered conjointly?
- Question 2: Are there significant differences in job applicants' attitudinal responses to supervised online personality and cognitive ability tests administered conjointly?
- Question 3: Do demographical differences (e.g. ethnic origin, gender, educational level and position applied for) relate to job applicants' attitudinal responses to supervised online personality and cognitive ability tests administered conjointly?
- Question 4: Do demographical differences (e.g. ethnic origin, gender, educational level and position applied for) relate to significant differences in job applicants' attitudinal responses to supervised online personality and cognitive ability tests administered conjointly?

The main purpose of the research was to determine the test-taking attitudinal responses of a demographically diverse sample of job applicants to personality and cognitive ability tests administered conjointly online under supervision and whether there are differences in test-taking attitudinal responses with respect to the type of test and the demographical subgroupings.

Method

Research approach

A non-experimental and cross-sectional quantitative survey research design was used in this study. More specifically, a descriptive and associational research approach was taken for the purposes of addressing the research questions (Gliner, Morgan & Leech, 2009). The research questions can be considered explorative in nature and current research to support clear directional hypotheses on the association between variables is lacking (Gliner et al., 2009).

Participants

The initial sample, which was a non-probability convenience sample, consisted of 175 respondents. However, after the exclusion of incomplete data, the data of 160 respondents were retained. The final sample consisted of 68 (42%) males, 91 (57%) females and one person of unspecified gender. Equity was achieved in terms of racial distribution by including 116 (73%) African respondents, 22 (13%) respondents of mixed race, 12 (8%) white respondents and 7 (4%) Indian respondents. The races of three participants were not specified. In respect of respondents' highest educational qualifications, the data indicated that 56 (35%) respondents had completed Grade 12, 43 (27%) had post-matric certificates, 52 (31%) had degrees, 8 (6%) had postgraduate qualifications and that the qualification of one person was not specified. Age distribution data showed that 80 (50%) people were younger than 30, 75 (47%) were older than 30, whereas the age of six respondents was not specified. The distribution according to position occupied was as follows: 118 (74%) were sales consultants, 26 (16%) were team leaders and 16 (9%) were branch managers.

Measuring instrument

In this study, a shorter and adapted version (20 items) of the Test Attitude Survey (TAS) by Smith (1997) was used as limited time was available to gather information on TAS during the proctored testing session. The original version (45 items) of the TAS was developed by Arvey et al. in 1990, which was specifically designed to assess job applicants' motivational and attitudinal dispositions towards standardised tests in selection contexts (Chu et al., 2014). As in the case of the original TAS, the current survey utilised a five-point Likert-type rating scale that ranged from 1 – Strongly Disagree to 5 – Strongly Agree (Arvey et al., 1990).

The areas included in the final survey distributed to the candidates of the current survey were based on Smith's adapted version of the TAS (Smith, 1997), namely:

- motivation (five items, e.g. doing well on the test[s] was important to me)
- lack of concentration (three items, e.g. I was bored while taking the test[s])
- belief in tests (four items, e.g. the test[s] is[are] probably a good way of selecting people for jobs)
- comparative anxiety (five items, e.g. I felt nervous when taking the test[s])
- external attribution (one item, I was ill or in a bad mood when I took the test[s])
- future effects (two items, e.g. the way I answered the test[s] should help me).

Procedure

The study utilised secondary data obtained from a talent management and assessment solutions organisation collected in the form of a TAS following the completion of supervised online cognitive ability and personality assessments. The

assessments in this study were conducted for the purpose of selecting employees to occupy different positions at a South Africa-based financial services organisation. The complexity levels of the cognitive tests were different for different positions, but the types of assessment (verbal and numerical cognitive ability tests and a forced-choice-item-type personality questionnaire) were the same for all three positions. The process followed was highly structured and the justice rules for conditions conducive to selection and favourable test practices (Gilliland & Steiner, 2012, p. 633) were taken into due consideration. Individuals who had applied for the positions at the organisation were personally contacted and invited to be participants in the online assessment stage. The online assessments were determined through a job profiling process to ensure job relatedness. The participants were given detailed information about the process to be followed on assessment day, the venue where assessments would be completed and what would be expected of participants.

For the data collection process, trained test administrators gave participants a standardised verbal set of instructions related to the purpose of the assessments (for selection), the types of assessment to be completed for relevant positions as well as the reason for inclusion (how the assessments provided job-related information). In addition to the verbal instructions, the online assessments included detailed written instructions as well as a test tutorial that outlined the benefit of honest responses in the personality test. Participants were informed that feedback on the outcome of their assessment phase would be provided within a week of completing the assessments. The same process was followed for the completion of the survey. A verbal explanation was given of the purpose of the survey (to research participants' attitudes), written instructions were given for the completion of the survey, and participants' informed consent was obtained.

Data analyses

The data analysis in this study was performed using the IBM Statistical Package for the Social Sciences (SPSS) Version 23. Descriptive statistics, which included frequency analyses of ethnicity, age, qualification and job roles, as well as variable descriptive statistics were provided. Confirmatory factor analysis (CFA) techniques for determining model fit were untenable in this study as only 160 candidates completed the TAS with respect to the cognitive ability and personality tests. A larger sample size was required to avoid inadequate model specification and to provide sufficient statistical power for the number of free parameters (40) that needed to be estimated (Kline, 2011). In some cases, the scales contained too few items (some consisting of only two) and consequently these scales did not reflect acceptable reliability scores. Therefore, exploratory factor analysis (EFA) using principal axis factoring (PAF) was applied to determine a more appropriate factor structure for the TAS that would appropriately represent the data. For further analyses of the TAS variables and the demographical subgroups, the analysis

of variance (ANOVA) test, *t*-test, Wilcoxon's *z*-statistic and the Kruskal–Wallis test were used for the purposes of this study.

Ethical considerations

This study is based on a master's dissertation by the first author, which was approved by the ethics committee of the Department of Human Resources Management in the Faculty of Economic and Management Sciences at the University of Pretoria. Permission to conduct this study was obtained from the talent management and assessment solutions organisation and the financial institution in question. Participants completed an informed consent form online prior to participating in the survey. They also gave their informed consent that the survey data could be used for research and noted that participation was voluntary and anonymity was assured.

Results

The Kaiser–Meyer–Olkin measure of sampling adequacy (KMO) and Bartlett's test of sphericity were used to determine the sample adequacy of the EFA to yield distinct and reliable factors (Field, 2009), both measures indicating the suitability of the data for use in factor analyses. The Bartlett's test of sphericity was highly significant ($p < 0.001$) and the KMO measures exceeded 0.85 for the use of the TAS with respect to both the cognitive ability and personality tests. Scree plots and Horn's parallel analysis were used to determine the number of significant factors to be retained (Field, 2009). As indicated in Figure 1, only two factors could be considered significant based on the 95% confidence interval of the inflexion point of the raw and random data's eigenvalues.

Three items were excluded that did not load significantly on any of the factors; therefore, the final version of the adapted TAS consisted of 17 items. In Table 1, the percentage variance that can be accounted for by each of the factors is presented. The total variability across both the factors was 43.96% for the cognitive ability tests and 51.81% for the personality test.

Table 2 presents the pattern matrix based on oblique rotation that contains item loadings that represent unique contributions to specific factors (Field, 2009). Oblique rotation is an appropriate rotation method if factors correlate. The factors were identified as TM (Factor 1) and general test attitude (TA) (Factor 2).

Tucker's congruence coefficient after targeted rotation was calculated to compare the pattern matrix of the TAS for the cognitive ability and personality tests (Van de Vijver & Leung, 1997). Values higher than 0.95 imply that the pattern matrices can be considered equivalent. The TAS showed factorial equivalence, which is considered important to make valid comparisons on the TAS for the respective tests. The correlation between the rotated factors was low, which represented differential validity. The correlations found were -0.261 for personality assessments and -0.234 for cognitive ability assessments.

Factor 1 accounted for the most variance in the overall scale and can be described as the attitudinal response of motivation (TM) related to the testing experience. TM factors relating to individuals' responses included the following: feeling that performing well in the assessment was important, doing well in the assessment was possible and trying one's best was important. Factor 1 also included individuals' applying high

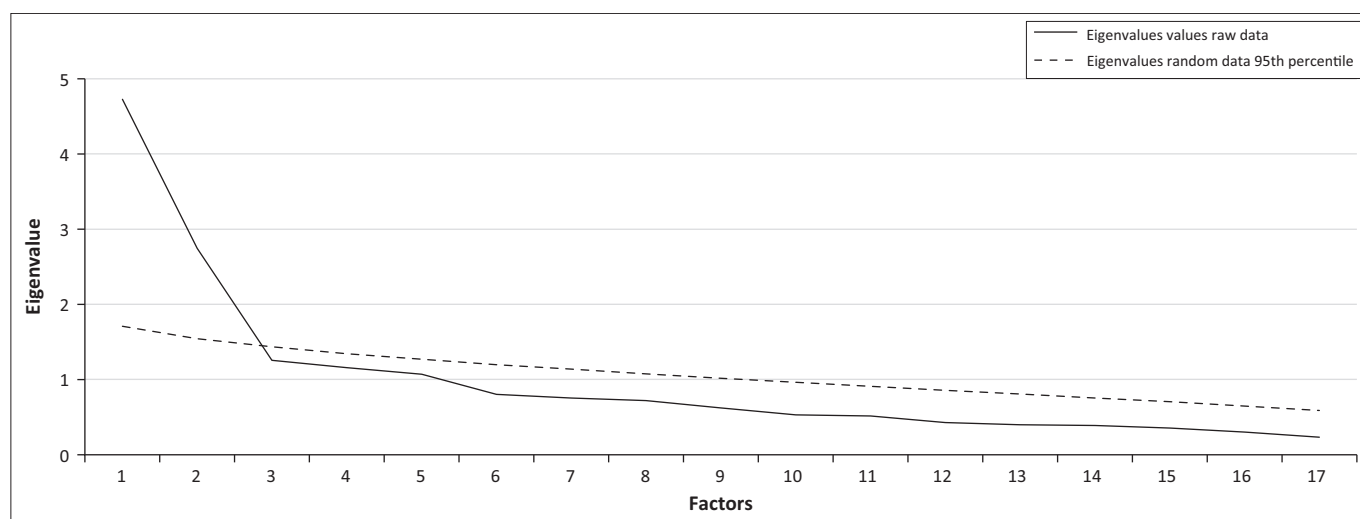


FIGURE 1: Scree plot and Horn's parallel test for number of significant factors to be retained on the Test Attitude Survey – an adapted version of the measure.

TABLE 1: Total variance of extracted factors explained for the Test Attitude Survey – an adapted version of the measure.

Factor	Cognitive ability tests: Initial eigenvalues			Personality test: Initial eigenvalues		
	Total	% of variance	Cumulative %	Total	% of variance	Cumulative %
1	4.73*	27.8	27.8	5.66*	33.32	33.32
2	2.75*	16.15	43.96	3.14*	18.5	51.81

*, Significant factors (95th percentile level).

levels of concentration in doing the assessment, expecting to do well in the assessment and caring about the outcome of the assessment. It should be noted that in the original version of the TAS (Arvey et al., 1990) the motivation dimension also accounted for the most variance in the overall scale.

Factor 2 represented the attitudinal response towards the tests in general (TA), which included the following: general feelings towards the content of questions and the manifestation of nervousness during testing, levels of apathy, dissatisfaction or satisfaction with the testing experience. The second factor also included belief that the assessments reflected a person's ability to perform in an occupational setting, perceived fairness of the assessment and if such measurement tools should be used or not for selection purposes.

The reliability (Cronbach's alpha) of the TAS scales was generally of an acceptable standard (see Table 3), with reliabilities that far exceeded the coefficient of 0.60 or above that can be utilised for group comparisons (Field, 2009; Owen & Taljaard, 1996).

The skewness and kurtosis coefficients reported for the TM scale represented non-normal distributions with respect to both the cognitive ability and personality tests (skewness and kurtosis between -2 and +2 are considered acceptable for

proving normal univariate distribution) (George & Mallery, 2010). Consequently, the Shapiro-Wilk test was performed to test the normality assumption statistically and it was rejected ($p < 0.00$). The score distributions appeared to be the same for both applications of the measure. For this reason, the non-parametric alternative for the dependent t -test (called the Wilcoxon signed-rank test) was used to determine the statistical difference between scale scores (Field, 2009). However, the TA scale scores were normally distributed according to the Shapiro-Wilk test and the dependent t -test was applied.

The statistical results are further reported as per research question that was formulated earlier in the article.

Question 1: What are the job applicants' attitudinal responses to supervised online personality and cognitive ability tests administered conjointly? When considering the means of the TAS items presented in Table 3, it can be seen that for both the cognitive ability and personality assessments for the TM items showed a high mean score of 4.16 and 4.21, respectively (high mean scores representing a positive TA). With regard to the item means for the TA scale, indications were that both tests were experienced dominantly positively, with item means at 3.48 and 3.53 for both the tests.

Question 2: Are there significant differences in job applicants' attitudinal responses to supervised online personality and cognitive

TABLE 2: Rotated factor pattern matrix and congruence coefficients for the Test Attitude Survey – an adapted version of the measure.

Items	Ability tests: Factor		Personality test: Factor	
	1	2	1	2
Doing well on the test(s) was important to me (M).	0.66 ^a	0.03	0.84 ^a	0.16
I was bored while taking the test(s) (C).	-0.17	0.43 ^a	-0.26	0.51 ^a
The test(s) is (are) probably a good way of selecting people for jobs (B).	0.26	-0.42 ^a	0.28	-0.46 ^a
I am not good at taking test(s) (A).	-0.03	0.40 ^a	-0.06	0.56 ^a
I felt nervous when taking the test(s) (A).	0.02	0.37 ^a	-0.09	0.42 ^a
I answered the questions of the test(s) as well as I could (M).	0.79 ^a	0.12	0.88 ^a	0.12
Questionnaire(s) like the test(s) should not be used (B).	0.14	0.50 ^a	0.15	0.65 ^a
I usually do pretty well on test(s) (A).	0.50 ^a	-0.04	0.60 ^a	-0.09
The way I answered the test(s) should help me (F).	0.73 ^a	-0.14	0.59 ^a	-0.23
I don't like answering questions like those in the test(s) (A).	0.00	0.60 ^a	-0.04	0.81 ^a
I tried my best in the test(s) (M).	0.84 ^a	0.15	0.86 ^a	0.14
I concentrated well when answering the test(s) questions (C).	0.70 ^a	-0.02	0.75 ^a	-0.08
I do not believe the test(s) can show how well a person could do in the job (B).	0.17	0.68 ^a	0.22	0.64 ^a
I expected to do well on the test(s) (A).	0.73 ^a	-0.01	0.85 ^a	-0.02
I get tense when answering questions about myself (A).	-0.10	0.32 ^a	-0.03	0.33 ^a
The test(s) is (are) unfair to some applicants (B).	-0.04	0.73 ^a	0.01	0.75 ^a
I just did not care how well I did on the test(s) (M).	-0.40 ^a	0.13	-0.38 ^a	0.13
Tucker's congruence coefficient between factors	-	-	0.96	0.97

() represents original scale names (Arvey et al., 1990) associated with the adapted items: M, motivation; C, concentration; A, anxiety; B, belief in tests; F, future effects.

^a, represents the salient loadings (> 0.30 or < -0.30) on the respective factors.

TABLE 3: Descriptive and Wilcoxon's statistics of the Test Attitude Survey – an adapted version of the measure.

Scales	N	Mean	SD	Skewness	Kurtosis	Reliability α	Significance tests: a-b
Ability – Test-taking motivation	160	4.16 ^a	0.93	-2.00	5.40	0.87	-
Personality – Test-taking motivation	160	4.21 ^b	0.87	-2.01	5.96	0.90	$z = -1.29$ ($p = 0.20$)
Ability – Test-taking attitude ^c	160	3.48 ^a	1.10	-0.01	-0.22	0.75	-
Personality – Test-taking attitude ^c	160	3.53 ^b	1.07	-0.02	-0.15	0.82	$t = 1.77$ ($p = 0.078$)

The five-point scale used to rate the items: 1, strongly disagree; 2, disagree; 3, neither disagree nor agree; 4, agree; 5, strongly agree.

^a, Test Attitude Survey scale scores for the ability test; ^b, Test Attitude Survey scale scores for the personality test; ^c, Note that the scales were reversed for purposes of the analysis so the direction and meaning of items and scale scores are similar for all scales.

α , Cronbach's alpha.

ability tests administered conjointly? The Wilcoxon's z-statistic and the t-test results presented in Table 3 showed insignificant differences between the TAS scores for each of the test types (cognitive ability and personality) with respect to which comparisons were made [TM: $z(160) = 1.29, p = 0.20$; TA: $t(160) = 1.77, p = 0.08$].

Question 3: Do demographical differences (e.g. ethnic origin, gender, educational level and position applied for) relate to job applicants' attitudinal responses to supervised online personality and cognitive ability tests administered conjointly? The demographic data from this study showed a significant deviation from the assumptions required for performing parametric-based statistical analysis techniques such as the ANOVA test (Field, 2009). The Kruskal–Wallis test is a non-parametric version of the one-way ANOVA test and can be used when normality assumptions are violated and when cell sizes are small ($n < 40$) and differences in cell sizes are large. The Kruskal–Wallis test (Chi-square statistic) was used to compare the total ranks between the demographic groups with respect to each of the TAS scales in this study.

With respect to each individual subscale, the Chi-square statistics showed that age did not have a significant effect on any of the TAS subscale scores for the cognitive ability tests [TM = $\chi^2(1,160) = 1.44, p = 0.23$; TA = $\chi^2(1,160) = 2.9, p = 0.09$] and the personality test [TM = $\chi^2(1,160) = 0.44, p = 0.51$; TA = $\chi^2(1,160) = 3.17, p = 0.08$].

Educational level did not have a significant effect on the TAS subscale scores for the cognitive ability tests [TM = $\chi^2(1, N=160) = 5.43, p = 0.07$; TA = $\chi^2(1,160) = 3.34, p = 0.19$] and the personality test [TM = $\chi^2(1,160) = 2.72, p = 0.51$; TA = $\chi^2(1,160) = 1.52, p = 0.47$] nor did the position applied for have a significant effect on the TAS subscale scores for the cognitive ability tests [TM = $\chi^2(1,160) = 0.17, p = 0.68$; TA = $\chi^2(1,160) = 0.12, p = 0.72$] and the personality test [TM = $\chi^2(1,160) = 0.5, p = 0.82$; TA = $\chi^2(1,160) = 0.39, p = 0.53$].

With respect to ethnic groups, the African group differed statistically significantly on all the TAS scales when compared to the composite of the remaining groups (mixed race, Indian and white). The Kruskal–Wallis test showed that the remaining groups' TAS scores did not differ significantly from each other with respect to both tests (p -values between 0.56 and 0.87) and, therefore, justified the grouping formed to increase the power of the comparative statistics between the composite group ($n = 40$) and the African group ($n = 116$). The African group appeared to be significantly more motivated than the rest of the group with respect to completing both the cognitive ability test [TM = $\chi^2(1,160) = 5.63, p = 0.02$] and the personality test [TM = $\chi^2(1, N=160) = 5.75, p = 0.016$] and had a significantly more positive general attitude towards both the cognitive ability test [TA = $\chi^2(1,160) = 7.16, p = 0.007$] and the personality test [TA = $\chi^2(1,160) = 7.73, p = 0.005$].

Question 4: Do demographical differences (e.g. ethnic origin, gender, educational level and position applied for) relate to significant differences in job applicants' attitudinal responses to

supervised online personality and cognitive ability tests administered conjointly? The Chi-square statistics showed that, with respect to the cognitive ability and personality tests, age did not significantly affect score differences on the two TAS subscales, namely, TM [$\chi^2(1,160) = 3.52, p = 0.07$] and TA [$\chi^2(1,160) = 0.575, p = 0.51$].

Similarly, the Chi-square statistics showed that, with respect to the cognitive ability and personality tests, educational level did not significantly affect score differences on the two TAS subscales [TM = $\chi^2(2,160) = 1.80, p = 0.40$; TA = $\chi^2(2,160) = 2.895, p = 0.206$].

Furthermore, the Chi-square statistics showed that, with respect to the cognitive ability and personality tests, ethnicity did not significantly affect score differences on the two TAS subscales [TM = $\chi^2(1,160) = 0.21, p = 0.65$; TA = $\chi^2(1,160) = 2.863, p = 0.09$].

However, the Chi-square statistics showed that, with respect to the cognitive ability and personality tests, the factor 'position applied for' had a non-significant effect on score differences on the TM subscale [$\chi^2(1,160) = 0.84, p = 0.36$] but a significant effect on the TA subscale [$\chi^2(1,160) = 4.759, p = 0.03$]. The applicants for the leadership positions (team leaders and branch managers) reacted statistically significantly more positively towards the cognitive ability test than towards the personality test, when compared to the applicants for sales positions.

Discussion

Outline of the results

The main purpose of the research was to determine the test-taking attitudinal responses of a diverse sample of job applicants towards a personality test and cognitive ability test administered conjointly in a supervised online test session. The job applicants showed attitudinal responses that were generally positive towards both the cognitive ability and personality tests that were used in a selection drive by a financial services company. On average, the respondents reacted positively towards both the measures in terms of TM and general TA. This is a promising finding as personality and cognitive ability tests are popular choices for inclusion in test batteries because of their generalisability of validity evidence and cost-effectiveness (Gilliland & Steiner, 2012).

The research found that the sample group did not respond significantly different to the cognitive ability test and the personality test used conjointly in the selection process. These results support the findings of Rosse et al. (1994) that the compartmentalisation of selection practices (e.g. interview, references checks, psychological tests and work sample tests) does not occur as readily within categories (e.g. psychological tests) and that tests may compensate for each other in terms of perceived relevancy and fairness, resulting in job applicants forming a heuristic evaluation of the test battery. As Hausknecht et al. (2004) have pointed out, the positive evaluation of a test battery and the forming of

positive TAs and belief in tests appear to be mostly situated in procedural justice perceptions of job relatedness, face validity and perceived predictive validity of tests. The tests used in this study had been carefully aligned to the requirements of the relevant jobs using job profiling processes to ensure job relatedness and high face validity.

In the literature, a variety of additional factors that influence TM and attitudes towards tests are identified and these include interpersonal treatment during testing (Schleicher et al., 2006), explanations and selection information (Truxillo et al., 2009), test format, question steering (ability to fake) and question invasiveness (Nikolaou et al., 2015). The TAs of the job applicants in this study may have been positively influenced as care was taken before and during the administration of the tests to adhere to Gilliland and Steiner's (2012, p. 633) version of justice rules for enhancing the perceived fairness of the selection process. With reference to the invasion of privacy theory of Bauer et al. (2006), the issue of invasiveness or propriety of questions may be more of an issue in personality tests than in cognitive ability tests and may be more salient and only important when blatantly violated (Gilliland, 2008). In terms of the AART of Ployhart and Harold (2004), favourable testing conditions (selection procedure justice) may counteract the attribution trigger, resulting in a critical stance towards individual tests. The forced-choice-item format of the personality test used in this study had the potential of eliciting negative responses as the perceived influence over the outcome of the assessment was reduced (Van Vianen et al., 2004). However, it appears that this may not have differentially skewed TAs in favour of the cognitive ability tests because of the compensatory effects of using the tests in combination (Rosse et al., 1994). Cognitive ability tests generally elicit more positive responses from job applicants because of the perceived scientific validity of these tests (Lievens et al., 2003) and the use of concrete test items instead of abstract test items (as was the case in this study) (Gilliland & Steiner, 2012). The three-option forced-choice-item format of the personality test that was applied in this study can be considered less laborious and cognitively challenging than a four-option format as far as making choices is concerned, leading to less anxiety and a more positive experience of the testing process (Vasilopoulos, Cucina, Dyomina, Morewitz & Reilly, 2006).

The research finding of Hausknecht et al. (2004) that applicants' perceptions of tests are not related to their personal characteristics (i.e. age, gender and ethnic background) is confirmed in this study with respect to all the demographical variables except ethnic group and job type. The finding of statistically significant higher TM and positive TA of the African group compared to the other ethnic groups refutes earlier findings of negative perceptions held by black groups in South Africa and abroad (De Jong & Visser, 2000; Foxcroft & Roodt, 2013; Whitman et al., 2014). The general drive of companies towards the restitution of previously disadvantaged groups and the use of tests that do not unfairly exclude any group, which are principles stipulated in the *Employment Equity Act* (Republic of South Africa, 2013), may

have raised the employment expectations of the African group and resulted in a higher TM and more positive TA. This proposition is supported by social identity theoretical perspectives suggesting that a job applicant's social identity matches a perceived organisational identity (such as culture, values and beliefs), leading to a positive expectation of the selection outcome, which is associated with high TM and a positive TA (Gilliland & Steiner, 2012; Nikolaou et al., 2015).

Compared to the job applicants applying for leadership positions, job applicants applying for the sales positions had a statistically significant more negative attitude towards the cognitive ability test than towards the personality test. The reason for this difference is not clear and needs further investigation. However, it may be argued that the more negative TA of sales position applicants may be attributable to self-serving bias formed by a negative perception of perceived performance in a test that they may have experienced as difficult (Whitman et al., 2014). Job applicants generally view personality tests as more controllable than cognitive ability tests, which may contribute to self-serving bias manifesting as a negative TA towards a cognitive ability test that is perceived as particularly difficult and consequently less valid (Van Vianen et al., 2004).

Steiner and Gilliland (1996) argue that people judge implicitly that widely used testing techniques must be valid, resulting in a favourable view of tests (belief in tests). So far, almost universally positive applicant reactions have been reported for Internet-based testing batteries, which in all likelihood has had an equally positive influence on TM and attitudes, also with respect to the motivation and attitudes of this study's job applicants as regards the personality and cognitive ability tests they completed (Anderson, 2003; Mead, 2001; Sylva & Mol, 2009).

Practical implication

The findings of this study hold promise for the continued use of the relevant instruments in the financial services company because positive TAs have been found to relate to perceived or actual performance and the perceived fairness of the testing process, which in turn promotes positive attitudes towards the selection process and the company in general (Burns et al., 2015; Schmitt, 2013). Furthermore, the way job applicants perceive the instruments a company uses for selection purposes is advantageous for business in that it plays an important role in attracting and retaining workers from different ethnic groups, influences societal perceptions of the company's commitment to fair selection practice and reduces the likelihood of legal action instituted by unsuccessful applicants (Gilliland & Steiner, 2012; Hausknecht et al., 2004). Therefore, investing resources in ensuring that the choice of tests and the testing conditions meet the selection justice rules for perceived fairness of the selection process (Gilliland & Steiner, 2012, p. 633) may be considered a good investment that will benefit the company and broader society.

Limitations and future directions

The most important limitations of the study were the relatively small convenience sample and the context-specific nature of the study as these have an impact on the generalisability of the findings to the broader population and other testing contexts. The design of the study was non-experimental; therefore, the impact of different test conditions resulting in differences in job applicants' TM and attitudinal reactions towards cognitive ability and personality tests were not determined. Such controls would, however, pose ethical and legal challenges in field studies as job applicants have a right to prescribed best practice testing conditions in terms of the Constitution of South Africa and this right is guarded by law and enforced by the Health Professions Council of South Africa (Foxcroft & Roodt, 2013).

It is proposed that future studies should focus on experimental research designs and simulations allowing for the systematic control of the effect of testing conditions using subjects who participate on a voluntary basis under mock testing conditions.

Conclusion

Research on how job applicants perceive and respond to tests has gained exponential popularity in recent years as practitioners have come to realise the importance of eliciting positive applicant reactions towards selection processes. Research has shown that the choice of tests for a selection process and the test conditions that apply during the administration of the tests may influence the TAs and motivational reactions adopted by the job applicants. This study produced evidence that a diverse group of job applicants applying for positions in a South African financial services company showed the same level of positive attitudinal and motivational responses towards personality and cognitive ability selection tests used conjointly in a selection battery. This finding supports the further use of the instruments in the relevant company provided that the psychometric properties of the specified measures have been shown to be acceptable for selection purposes in the company.

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Competing interests

The authors declare that they have no financial or personal relationships that may have inappropriately influenced them in writing this article.

Authors' contributions

R.V. conceptualised the study, did the initial literature review, planned and executed the empirical survey, did the initial statistical analyses and presented the findings as part of a

master's degree study under supervision of the second author. R.V. also reviewed and adjusted the final draft of the article. P.S. wrote the article for publication, refined the literature review, refined the methodology and statistical analyses and presented the findings from the study.

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