Validation of a test battery for the selection of call centre operators in a communications company

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Our aim was to determine whether personality and ability measures can predict job performance of call centre operators in a South African communications company. The predictors were personality variables measured by the Customer Contact Styles Questionnaire, Basic Checking and Audio Checking ability tests. These measures were completed by 140 operators. Supervisors completed the Customer Contact Competency Inventory for the operators as a measure of job performance. Additional criterion data were utilised by obtaining performance statistics regarding call handling time and quality of responding. Correlations and multiple regression analyses revealed statistically significant small to medium effect size correlations between the predictors and criteria.

Keywords: call centre; cognitive ability; job performance prediction; job performance statistics; personality; test battery validation

Call centres have emerged as one response to our changing world of work and the need to improve efficiency and customer service delivery. These centres offer versatility and present a means to provide quick and efficient service. Call centres aid customer service delivery and assist in consolidating customer service business operations (Anton, 2000; Zapf, Isic, Bechtoldt & Blau, 2003).

However, finding and selecting appropriate call centre candidates presents a business challenge (Levin, 2001). A large number of candidates are available in the market, but the selection of suitable candidates is not always easy (O'Hara, 2001). Improved selection strategies are needed to aid the identification and selection of the right candidates, and selection instruments are suggested as one way to aid this decision making process (Els & De Villiers, 2000; Phelps, 2002).

The aim in this study was to validate a test battery for the selection of call centre operators within a communications company.

Selection

Selection of the best personnel is critical, specifically in a people intensive environment such as a call centre (Menday, 1996). Tests are typically used in the selection decision making process to predict future job performance (Kaplan & Saccuzzo, 2001). Personality and ability assessments are two such types of assessments that are at the centre of this study.

Personality assessment specifically deals with behaviour from a non intellectual or affective stance (Anastasi & Urbina, 1997). Research by Barrick and Mount (1991), Hurtz and Donovan (2000) and Mount and Barrick (1998) have highlighted support for the use of personality assessment as an effective predictor of performance, more especially when the Big Five approach to personality is utilised.

In Barrick and Mount's (1991) meta analytic study it was shown that Conscientiousness served as the most consistent predictor of job success. Lowery, Beadles and Krilowicz (2004) emphasised that the selection of resources for an organisation is of such a critical nature that, even in instances where relatively small validities are reported, when added to the overall body of knowledge they provide an additional source of information to explain small variabilities in job performance.

An article that criticised the use of self report personality tests in personnel selection contexts (Morgeson *et al.*, 2007a) triggered a debate that raised interesting questions. In response, Ones,

Dilchert, Viswesvaren and Judge (2007) pointed out that numerous studies and meta analyses indicate strong support for using personality measures in staffing decisions. Tett and Christiansen (2007) indicated that meta analyses have demonstrated useful validity estimates when validation is based on confirmatory research, using job analysis as basis and also taking into account the bi directionality of trait performance linkages. Morgeson *et al.* (2007b) again responded and pointed out that, when discussing the value of personality tests for selection, the most important criteria are those that reflect job performance. Based on the strong support for personality measures, a personality questionnaire was included in this study as a predictor variable.

The role of ability assessment has long been supported. Of interest, however, is the role of ability assessment together with personality. Lowery *et al.* (2004) supported the use of personality in selection and in their study added the element of cognitive ability. They found that the combined effect of cognitive ability and personality added a significant amount of predictive power in explaining job performance. The same conclusion had been drawn by Outtz (2002), Wright, Kacmar, McMahan and Deleeuw (1995) and Ackerman and Heggstad (1997). Previous research has therefore shown that personality and performance are related with a moderating effect of cognitive ability.

Test validation

Validity is regarded by some as the most important consideration for any selection procedure (Schultz & Schultz, 1998). Criterion related validation with job performance as a predictor (Anastasi & Urbina, 1997) is suggested as most appropriate for personality and aptitude measures. A concurrent validation approach was adopted for this study.

Call centre performance measurement

A number of call centre performance measures are typically used and include productivity measurements, adherence measurements and qualitative measurements. The objective with the study was to determine to what extent scores on personality and ability tests correlate with the job competencies and job performance measures of call centre operators.

METHOD

Participants

The study was conducted within the operator services division of a national communications company. The population consisted of 246 call centre operators reporting to 14 supervisors spread across three inbound call centres. A purposeful non random sampling technique was used to select the sample that consisted of 150 operators. The supervisors were asked to rank their operators according to performance, and the top six and bottom six performers per operator were included in the sample. One supervisor refused.

There were 46 (32.9%) males and 94 (67.1%) females in the sample. All race groups were represented with 49 black, 37 coloured, 2 Indian, and 52 white participants. Education levels ranged from Grade 8 to tertiary level with the bulk of the sample (66.4%) being in possession of Grade 12 certificates. The ages of the operators ranged from 26 to 59 years with a mean age of 38.16 years (*SD* 6.81).

The mean length of service was 12.66 years (*SD* 5.62), whereas the mean for time in current position was 8.89 years (*SD* 1.46).

Measuring instruments

The selection of appropriate independent variable measures was based on a job analysis using the Work Profiling System (SHL, 2005). Three independent variable measures were selected, namely, the Customer Contact Styles Questionnaire Version 7.2, the Basic Checking and Audio Checking tests of the Personnel Test Battery (SHL, 2000a). Three criterion measures were obtained, namely, supervisory performance ratings on the various competencies of the CCCI (Baron, Hill, Janman & Schmidt, 1997), and performance data regarding Average Call Handling Time and Call Quality.

Customer Contact Styles Questionnaire

The CCSQ7.2 was utilised as the personality predictor and is a self report personality questionnaire that is utilised in the selection and development of people at work in non supervisory sales or customer service roles. It details information relating to personality along 16 dimensions (SHL, 2000a; 2006). The questionnaire consists of 128 statements and includes both normative and partially ipsative items. For the normative items, respondents are required to rate each statement on a five point Likert scale. The statements are furthermore grouped into 32 sets of four and respondents are required to indicate the statement among the four that is most typical of them and that which is least true or typical of them. These form the ipsative items in the questionnaire. In this study, a so called "nipsative" (normative/ipsative) approach was followed whereby all normative item totals and ipsative item totals for a particular scale were totalled and added together. This resulted in a single score for the scale.

For the nipsative scoring, all items were scored on a seven point scale, one to five points for the Likert scale ratings plus zero to two points for the partially ipsative ranking. This approach improved the psychometric properties, because the reliabilities and scale variances were higher than for the normative or ipsative versions, respectively. The nipsative version maintained some positive properties of typically ipsative scales. These were lower interscale correlations than in the normative version, and smaller increases in scale scores for job applicant groups which may indicate better control for social desirability (SHL, 2000a).

Mean alpha reliabilities of approximately 0.82 were reported in international studies (Baron *et al.*, 1997). In local studies, alpha coefficients ranging from 0.76 to 0.90 (SHL, 2001); 0.74 to 0.90 (SHL, 2000b); and 0.75 to 0.90 (SHL, 2000c) have been reported. International studies have shown the predictive relationship of this instrument to performance (Baron *et al.*, 1997). A normative version, the CCSQ5.2, was used by La Grange and Roodt (2001) and the results showed that several personality dimensions predicted job performance.

Personnel Test Battery Basic Checking and Audio Checking

The CP7.1 and CP8.1 tests were used as the ability predictor measures. The CP7.1 is an 80 item test aimed at a basic level and is used predominantly for positions that require routine checking. Locally, internal consistency reliabilities of 0.93 for a sample of 9 665 employees (SHL, 2003a) and 0.94 for a sample of 1 379 respondents (SHL, 2003b) have been reported. A criterion related validity coefficient of 0.14 was reported for 51 air traffic controllers (SHL, 2004).

The 60 item CP8.1 tests speed and accuracy in checking information and require processing of verbal information, either telephonically or face to face. An internal consistency reliability coefficient of 0.85 has been reported (SHL, 2003a). In a study on air traffic controllers, a criterion related validity coefficient equal to 0.26 in predicting college performance was reported (SHL, 2004).

Customer Contact Competency Inventory

The CCCI was used as one of the criterion measures. It is designed for measuring performance of non managerial sales and customer service staff against 16 competencies. Job analysis results were used to rank the importance of the competencies. Five competencies were regarded as extremely important and are listed in Table 2 (Baron *et al.*, 1997).

The CCCI can be used on a 360 degree assessment basis to provide feedback in terms of performance. Only supervisor assessments were utilised in the study. The questionnaire consists of 128 statements presented in groups of four statements which respondents have to rate on a five point Likert scale. Respondents are also required to indicate which of the four statements is most true or typical and which is least true or typical of the individual being rated (Baron *et al.*, 1997). For this study, a nipsative approach similar to that of the CCSQ7.2 was followed. This resulted in a single score for the scale.

Reliability coefficients ranging from 0.67 to 0.92 were reported by Baron *et al.* (1997). The

CCCI was used as criterion measure in a validation study by La Grange and Roodt (2001) who reported acceptable reliabilities for three criterion measures based on the results of a factor analytic study (0.98, 0.95 and 0.95). Concurrent validation studies reported by Baron *et al.* (1997) found significant correlations between the instrument and most of the core competencies identified for the position.

Average Call Handling Time and Call Quality

As suggested by Bryman (1995), more than one criterion measure was used to reduce the dependence on responses using one instrument. Two measures of performance were used, namely, Average Call Handling Time and Call Quality.

Procedure

Predictor data were obtained from the operators. Internal HR consultants assisted with data gathering for the main criterion data. They, in turn, trained supervisors for assessing the candidates. The additional criterion data were requested from the organisation and performance statistics for the sample for a 12 month performance cycle were obtained.

RESULTS

Our purpose in the study was to determine whether a test battery could assist in predicting job performance of call centre operators. The focus was on establishing the magnitude of the relationships between the predictors and the criteria.

Descriptive statistics

Descriptive statistics and internal consistency reliabilities were calculated for the predictors and criteria. The results are presented in Table 1. The alpha coefficients calculated for the CCSQ7.2 ranged from 0.64 to 0.86 and are regarded as acceptable reliabilities for personality tests. The alpha coefficients for the ability tests were 0.86 and 0.93 which are acceptable within a selection context.

The reliabilities for the CCCI competencies were acceptable, and ranged from 0.78 to 0.91. These compared favourably with those reported for manager assessments in the literature review. Means, standard deviations, minimum and maximum scores were calculated for the additional criterion data, Average Call Handling Time and Average Quality. A mean of 29.00 seconds was calculated for Average Call Handling Time. The mean for Average Quality was 91.82.

Intercorrelations

Intercorrelations between the various scales of the CCSQ7.2 personality measure were calculated to determine the degree of overlap between the scales. The absolute values of the intercorrelations ranged from 0.00 to 0.56, the latter being the correlation between Structured and Detail Conscious. The intercorrelations between the CCSQ7.2 scales support results obtained in previous studies (Baron *et al.*, 1997).

A relatively high correlation of 0.65 was obtained between the ability tests, possibly because both tests measure ability for checking. Furthermore, general reasoning ability tends to play a role in most abilities which is reflected in shared variance in performance across ability scores (Anastasi & Urbina, 1997).

The intercorrelations between the various competencies of the CCCI were generally larger than expected, because only five of the intercorrelations were not statistically significant and ranged from 0.02 to 0.82 which was the correlation between Quality Orientation and Results Driven. These high intercorrelations need to be kept in mind in interpreting the findings. The intercorrelation results discussed here are not reported in a table.

Table 1. Descriptive statistics and internal consistency reliabilities for the predictors and criteria

	<i>M</i>	<i>SD</i>	Minimum	Maximum	<i>r</i> _{tt}
CCSQ7.2 Scales					
Persuasive CR1	28.64	6.06	15	44	0.69
Self Control CR2	42.61	7.38	25	61	0.78
Emphatic CR3	48.21	6.74	32	61	0.79
Modest CR4	41.60	6.41	25	56	0.67
Participative CR5	49.68	8.91	24	65	0.86
Sociable CR6	35.89	6.84	21	54	0.76
Analytical CT1	38.72	5.81	20	52	0.76
Innovative CT2	39.39	6.39	24	56	0.76
Flexible CT3	33.20	5.47	21	44	0.74
Structured CT4	39.74	5.90	17	53	0.79
Detail Conscious CT5	37.26	4.15	24	47	0.66
Conscientious CT6	36.15	5.11	21	48	0.76
Resilience CE1	35.70	6.57	18	51	0.64
Competitive CE2	29.85	7.85	9	46	0.82
Results Oriented CE3	34.58	4.82	22	46	0.69
Energetic CE4	31.34	5.83	17	44	0.77
Consistency CE5	54.05	4.99	42	68	
Ability tests					
Basic Checking CP7.1	50.21	10.32	22	73	0.93
Audio Checking CP8.1	38.06	8.50	15	55	0.86
CCCI competencies					
Relating to Customers P1	40.86	6.83	17	54	0.85
Convincing P2	32.64	6.29	18	53	0.80
Communicating Orally P3	38.79	6.37	18	52	0.80
Communicating in Writing P4	34.26	7.64	16	55	0.88
Team Working P5	39.16	6.63	20	52	0.83
Fact Finding I1	36.69	6.51	19	52	0.81
Problem Solving I2	31.35	7.36	11	49	0.85
Business Awareness I3	32.75	6.14	17	48	0.78
Specialist Knowledge I4	33.81	7.92	15	53	0.88
Quality Orientation D1	39.63	8.74	21	56	0.91
Organisation D2	33.10	6.85	15	54	0.82
Reliability D3	41.31	7.02	19	53	0.82
Customer Focus E1	41.81	7.46	20	55	0.89
Resilient E2	33.15	8.34	11	51	0.87
Results Driven E3	35.21	8.79	13	52	0.89
Using Initiative E4	35.53	7.74	15	52	0.86
Additional criterion measures					
Mean monthly call handling time	29.00	4.47	27.50	31.69	
Mean monthly quality rating	91.82	7.85	89.02	94.04	

Correlations

Correlations were calculated between the independent and dependent variables for testing the hypotheses. The guidelines suggested by Cohen (1988) for interpreting the magnitudes of the effect sizes were followed.

Correlations for the CCCI behavioural criteria

Correlations between the predictors and the various criterion competencies of the CCCI are presented in Table 2. The labels for competencies as listed by Baron *et al.* (1997) are given below the table.

Table 2. Correlations between the predictors and CCCI behavioural criteria (*N* = 140)

	P1	P2	P3	P4	P5	I1	I2	I3	I4	D1	D2	D3	E1	E2	E3	E4
CCSQ7.2																
Consistency (CCO)	0.13	0.09	0.08	0.03	0.09	0.18*	0.19*	0.02	0.06	0.22**	0.12	0.19*	0.18*	0.14	0.08	0.19*
Resilience (CE1)	0.10	0.05	0.10	0.05	0.09	0.06	0.06	0.06	0.09	0.04	0.09	0.07	0.03	0.09	0.01	0.01
Competitive (CE2)	0.08	0.10	0.17*	0.07	0.09	0.02	0.13	0.12	0.02	0.04	0.18*	0.04	0.01	0.05	0.02	0.07
Results Oriented (CE3)	0.16	0.22**	0.09	0.12	0.16	0.18*	0.34**	0.24**	0.13	0.36**	0.34**	0.19*	0.21**	0.22**	0.36**	0.28**
Energetic (CE4)	0.05	0.17*	0.02	0.00	0.07	0.03	0.22**	0.16	0.08	0.03	0.08	0.07	0.01	0.11	0.05	0.05
Persuasive (CR1)	0.01	0.12	0.06	0.06	0.07	0.08	0.04	0.02	0.08	0.12	0.04	0.08	0.04	0.07	0.10	0.10
Self Control (CR2)	0.18*	0.02	0.11	0.09	0.02	0.03	0.06	0.03	0.03	0.10	0.06	0.05	0.19*	0.14	0.06	0.07
Empathic (CR3)	0.00	0.03	0.09	0.09	0.02	0.01	0.06	0.02	0.06	0.02	0.04	0.07	0.04	0.01	0.04	0.02
Modest (CR4)	0.09	0.00	0.03	0.01	0.03	0.22**	0.13	0.15	0.16	0.14	0.19*	0.19*	0.08	0.10	0.15	0.16
Participative (CR5)	0.00	0.11	0.02	0.04	0.11	0.09	0.01	0.09	0.17*	0.06	0.14	0.10	0.02	0.10	0.06	0.05
Sociable (CR6)	0.08	0.15	0.01	0.11	0.16	0.10	0.10	0.03	0.11	0.10	0.00	0.12	0.01	0.10	0.07	0.08
Analytical (CT1)	0.05	0.23**	0.04	0.11	0.01	0.19*	0.34**	0.14	0.11	0.10	0.20*	0.01	0.06	0.10	0.14	0.19*
Innovative (CT2)	0.00	0.18*	0.15	0.05	0.02	0.01	0.21**	0.07	0.03	0.09	0.07	0.08	0.09	0.02	0.06	0.13
Flexible (CT3)	0.06	0.18*	0.07	0.08	0.06	0.09	0.20*	0.04	0.04	0.05	0.11	0.12	0.09	0.07	0.16	0.08
Structured (CT4)	0.32**	0.27**	0.23**	0.23**	0.18*	0.32**	0.36**	0.26**	0.23**	0.33**	0.26**	0.22**	0.29**	0.22**	0.28**	0.35**
Detail Conscious (CT5)	0.10	0.14	0.12	0.06	0.09	0.17*	0.22**	0.12	0.08	0.17*	0.08	0.04	0.15	0.10	0.11	0.12
Conscientious (CT6)	0.06	0.05	0.05	0.09	0.03	0.12	0.17*	0.07	0.13	0.19*	0.18*	0.12	0.07	0.00	0.13	0.14
Ability tests																
Basic Checking (CP7.1)	0.13	0.17*	0.20*	0.18*	0.09	0.34**	0.25**	0.27**	0.32**	0.27**	0.23**	0.29**	0.18*	0.20*	0.26**	0.30**
Audio Checking (CP8.1)	0.09	0.27**	0.33**	0.20*	0.16	0.39**	0.32**	0.28**	0.32**	0.28**	0.18*	0.09	0.10	0.22**	0.28**	0.37**

* Significant correlations at the 0.05 level;

** Significant correlations at the 0.01 level

People focus			Information handling			Dependability			Energy		
P1	Relating to Customers		I1	Fact Finding		D1	Quality Orientation		E1	Customer Focus	
P2	Convincing		I2	Problem Solving		D2	Organisation		E2	Resilient	
P3	Communicating Orally		I3	Business Awareness		D3	Reliability		E3	Results Driven	
P4	Communicating in Writing		I4	Specialist Knowledge					E4	Using Initiative	
P5	Team Working										

The most notable aspect of the correlations involving the CCSQ7.2 predictors was that Structured correlated significantly with all the behavioural criteria of the CCCI. The correlations reflect small to medium effect sizes. Results Oriented proved to be another good predictor of the behavioural competencies, because 11 out of 16 correlations were significant. Except for a correlation of 0.34 reported between Analytical and Problem Solving, there were no further medium size correlations between the personality predictors and the competencies.

With regard to the correlations between the ability tests and the CCCI competencies, both tests proved to be adequate predictors of the criteria. Once again most of the correlations were significant and represented small to medium effect sizes. The strongest correlations were obtained when Audio Checking was correlated with Fact Finding and Using Initiative, resulting in correlations of 0.39 and 0.37, respectively.

Correlations for the performance data

Correlations between the predictors and additional criterion data captured as Average Call Handling Time and Average Quality are presented in Table 3.

Table 3. Correlations between the predictors and performance data

	Average call handling time (<i>N</i> = 138)	Average quality (<i>N</i> = 106)
CCSQ7.2		
Consistency (CCO)	0.15	0.27**
Resilience (CE1)	0.05	0.11
Competitive (CE2)	0.04	0.01
Results Oriented (CE3)	0.23**	0.42**
Energetic (CE4)	0.01	0.09
Persuasive (CR1)	0.24**	0.17
Self Control (CR2)	0.06	0.18
Empathic (CR3)	0.07	0.10
Modest (CR4)	0.10	0.06
Participative (CR5)	0.21**	0.02
Sociable (CR6)	0.21**	0.21*
Analytical (CT1)	0.05	0.11
Innovative (CT2)	0.11	0.00
Flexible (CT3)	0.11	0.14
Structured (CT4)	0.05	0.38**
Detail Conscious (CT5)	0.01	0.28**
Conscientious (CT6)	0.16	0.35**
Ability tests		
Basic Checking (CP7.1)	0.27**	0.28**
Audio Checking (CP8.1)	0.26**	0.39**

* Significant correlations at the 0.05 level; ** Significant correlations at the 0.01 level

Among the personality predictors, Results Oriented emerged as a good predictor of the criteria, because it correlated 0.23 with Average Call Handling Time and 0.42 with Average Quality. Only four personality scales correlated significantly with Average Call Handling Time yielding small correlations, whereas Average Quality yielded moderate correlations of 0.42, 0.38 and 0.35 with Results Oriented, Structured, and Conscientious, respectively. It appeared that the personality scales predicted Average Quality somewhat better than Average Call Handling Time.

The ability tests emerged as good predictors of the criteria, because both tests correlated significantly with the performance data. The correlations of Basic Checking and Audio Checking with

Average Call Handling Time were 0.27 and 0.26, respectively, whereas they correlated 0.28 and 0.39 with Average Quality.

Correlation between the criteria and biographical information

Correlations were calculated between the respondents' biographical data and CCCI criterion data to determine the effect of possible moderator variables. Race, years of service, and age correlated significantly with the CCCI behavioural criteria. As a result, partial correlations were calculated to determine the relationship between the predictors and criteria with the effects of race, years of service and age removed. The correlations changed very little. These variables were therefore not taken into account when processing the regressions.

Regression analyses

A standard regression analysis was performed for each of the eight Extreme Importance and High Importance competencies, as well as for the two performance measures. Altogether 10 multiple regression analyses were conducted. The CCSQ7.2 scales and abilities that were hypothesised to be predictors of the criteria were entered into the regression. Regressions that yielded large effect sizes are discussed.

The data were examined to determine whether the assumptions underlying multiple regression were met for the regressions to be performed. Firstly, scatterplots between the independent and dependent variables were examined to establish whether the relationships were linear. No sign of marked nonlinearity was observed. Secondly, the residual plots of the standardised residual values against the standardised predicted values were examined to determine whether the error values were independent and yielded equal variances. There was no indication of correlations between these errors, and a fair degree of homoscedasticity appeared to be present. Thirdly, the normal probability plots of the residuals against the expected normal values were examined to establish whether the error values yielded normal distributions. Some deviation from normality was observed. Since regression is fairly robust to moderate deviations from normality, we decided to proceed as if the assumption of normality was met.

Regression for dependent variable: Quality Orientation

It was hypothesised that Quality Orientation correlates positively with Analytical, Structured, Detail Conscious, Conscientious, Results Oriented, Basic Checking and Audio Checking. The multiple correlation of $R = 0.52$ was significantly different from zero [$F(7, 132) = 6.85, p < 0.01$] and equalled a strong effect size (see Table 4). In this instance 27% of the total variance of Quality Orientation was explained by the seven independent variables, but only four of the independent variables, namely, Results Oriented, Analytical, Structured and Audio Checking, contributed significantly to predicting the dependent variable.

Regression for dependent variable: Fact Finding

It was hypothesised that Fact Finding correlates positively with Analytical, Structured, Detail Conscious, Conscientious, Results Oriented, Basic Checking and Audio Checking. For Fact Finding the multiple correlation of $R = 0.50$ was significantly different from zero [$F(7, 132) = 6.30, p < 0.01$] which is a strong effect size (see Table 5). Only two of the independent variables, Structured and Audio Checking, contributed significantly to predicting the dependent variable. Altogether 25% of the variability in Fact Finding was predicted by knowing scores on the seven independent variables.

Regression for dependent variable: Average Call Handling Time

It was hypothesised that Results Oriented, Persuasive, Sociable, Structured, Conscientious, Basic Checking and Audio Checking correlate with Average Call Handling Time. As presented in Table

Table 4. Regression summary for dependent variable: Quality Orientation

ANOVA						
Multiple correlation (R)	0.52					
R squared	0.27					
Adjusted R squared	0.23					
Standard Error of Estimate	7.68					
$F(6, 133)$	5.73, $p < 0.01$					
	β	SE	b	SE	$t(133)$	p
Intercept			3.40	7.35	0.46	0.64
Results Oriented (CE3)	0.31	0.09	0.56	0.16	3.63	0.00
Analytical (CT1)	0.22	0.10	0.34	0.15	2.28	0.02
Structured (CT4)	0.28	0.10	0.42	0.15	2.83	0.01
Detail Conscious (CT5)	0.01	0.10	0.02	0.21	0.11	0.91
Conscientious (CT6)	0.01	0.09	0.02	0.15	0.15	0.88
Basic Checking (CP7.1)	0.07	0.10	0.06	0.09	0.72	0.47
Audio Checking (CP8.1)	0.21	0.10	0.22	0.10	2.11	0.04

Table 5. Regression summary for dependent variable: Fact Finding

ANOVA						
Multiple correlation (R)	0.50					
R squared	0.25					
Adjusted R squared	0.21					
Standard Error of Estimate	5.78					
$F(7, 132)$	6.30, $p < 0.01$					
	β	SE	b	SE	$t(133)$	p
Intercept			14.17	5.53	2.56	0.01
Results Oriented (CE3)	0.03	0.09	0.04	0.12	0.37	0.71
Analytical (CT1)	0.03	0.10	0.03	0.11	0.28	0.78
Structured (CT4)	0.32	0.10	0.35	0.11	3.14	0.00
Detail Conscious (CT5)	0.05	0.10	0.08	0.15	0.49	0.63
Conscientious (CT6)	0.08	0.09	0.10	0.11	0.87	0.39
Basic Checking (CP7.1)	0.12	0.10	0.07	0.06	1.16	0.25
Audio Checking (CP8.1)	0.29	0.10	0.22	0.08	2.90	0.00

6, the multiple correlation of $R = 0.49$ was significantly different from zero [$F(7, 130) = 6.01, p < 0.01$] which is a strong effect size. Only two of the independent variables, Results Oriented and Persuasive, contributed significantly to predicting the dependent variable. Altogether 24% of the variability in Average Call Handling Time was predicted by knowing scores on the seven independent variables.

Regression for dependent variable: Average Quality

For the dependent variable Average Quality, Results Oriented, Self Control, Sociable, Analytical, Structured, Detail Conscious, Conscientious, Basic Checking and Audio Checking were selected as the independent variables. As presented in Table 7, a multiple correlation of $R = 0.74$ representing a strong effect size was obtained. The R for regression was significant [$F(9, 96) = 12.81, p < 0.01$]. In this instance 55% of the total variance of Average Quality was explained by the nine independent

variables, whereas five of the independent variables contributed significantly to predicting the dependent variable.

Table 6. Regression summary for dependent variable: Average call handling time

ANOVA						
Multiple correlation (<i>R</i>)	0.49					
<i>R</i> squared	0.24					
Adjusted <i>R</i> squared	0.20					
Standard Error of Estimate	3.56					
<i>F</i> (7, 130)	6.01, <i>p</i> < 0.01					
	β	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>t</i> (133)	<i>p</i>
Intercept			34.87	3.40	10.26	0.00
Results Oriented (CE3)	0.34	0.09	0.29	0.07	3.87	0.00
Persuasive (CR1)	0.23	0.08	0.15	0.06	2.68	0.01
Sociable (CR6)	0.19	0.09	0.11	0.05	2.17	0.03
Structured (CT4)	0.10	0.09	0.07	0.06	1.04	0.30
Conscientious (CT6)	0.09	0.09	0.07	0.07	1.02	0.31
Basic Checking (CP7.1)	0.16	0.10	0.06	0.04	1.52	0.13
Audio Checking (CP8.1)	0.07	0.10	0.03	0.05	0.67	0.50

Table 7. Regression summary for dependent variable: Fact Finding

ANOVA						
Multiple correlation (<i>R</i>)	0.74					
<i>R</i> squared	0.55					
Adjusted <i>R</i> squared	0.50					
Standard Error of Estimate	3.83					
<i>F</i> (9, 96)	12.81, <i>p</i> < 0.01					
	β	<i>SE</i>	<i>b</i>	<i>SE</i>	<i>t</i> (133)	<i>p</i>
Intercept			59.72	4.80	12.43	0.00
Results Oriented (CE3)	0.45	0.08	0.51	0.09	5.53	0.00
Self Control (CR2)	0.19	0.07	0.14	0.05	2.62	0.01
Sociable (CR6)	0.29	0.08	0.23	0.06	3.80	0.00
Analytical (CT1)	0.29	0.09	0.27	0.09	3.13	0.00
Structured (CT4)	0.17	0.09	0.16	0.09	1.86	0.07
Detail Conscious (CT5)	0.17	0.09	0.23	0.12	1.93	0.06
Conscientious (CT6)	0.11	0.08	0.12	0.09	1.36	0.18
Basic Checking (CP7.1)	0.05	0.09	0.02	0.05	0.50	0.62
Audio Checking (CP8.1)	0.38	0.09	0.24	0.06	3.99	0.00

DISCUSSION

The findings support evidence presented in the literature review that personality can be used as a predictor of performance. Although there were a number of small to moderate correlations between some of the CCSQ7.2 scales and the CCCI behavioural criteria, it appeared that Structured and Results Oriented were moderately strong predictors of almost all of the CCCI behavioural criteria. Baron *et al.* (1997) reported a principal components analysis which showed that Structured, Results Oriented, Analytical, Detail Conscious and Conscientious loaded onto a Factor 1 that was labelled

Conscientiousness and resembled a factor of the Big Five personality theory. The findings of the present study are somewhat similar to those of Barrick and Mount's (1991) meta analytic study in which Conscientiousness was found to be the most consistent predictor of performance. Conscientiousness clearly impacts on the five competencies that were regarded as extremely important for call centre operators.

The relatively high alpha reliabilities of the CCCI behavioural criteria (mean reliability of 0.846) precluded the need to correct for attenuation in the criterion variables, because such corrections would have little impact on the magnitude of the validity coefficient.

It appeared that the personality scales predicted Average Quality somewhat better than Average Call Handling Time. The moderate to strong correlations found between Average Quality and Results Oriented, Structured, Detail Conscious and Conscientious are of interest. The link between these scales and the definition of quality in terms of being accurate and professional is evident and assists in explaining these strong correlations. Furthermore, these four personality predictors are included in the five scales measuring Conscientiousness as found in the Baron *et al.* (1997) study. The results once again point to Conscientiousness as being the strongest predictor of performance, in this instance of a subjective criterion.

For Average Call Handling Time, the finding regarding Conscientiousness was not replicated, but four of the personality variables correlated significantly with this criterion. Due to the nature of operator job performance and a need to keep calls short, the negative relationship between Results Oriented and Average Call Handling Time was to be expected. Furthermore, short handling times were associated with not being Persuasive, Participative, and Sociable.

Correlations representing small to medium effect sizes were obtained between the CCCI behavioural criteria and the two ability tests, Basic Checking and Audio Checking. Both appeared to predict the behavioural criterion Fact Finding best. Given the nature of the job and the measurement properties of the ability tests, these substantial correlations were to be expected.

The concurrent validity coefficients obtained for the ability tests when predicting the CCCI criteria were generally stronger than those reported in a validation study for the selection of air traffic controllers (SHL, 2004). Small to moderate correlations were obtained between ability tests and various course results. For the Basic Checking test the validity coefficients varied from 0.00 to 0.24, whereas for the Audio Checking test they varied from 0.03 to 0.39.

Regarding the correlations between the ability tests and the performance data, moderate negative correlations were obtained for Average Call Handling Time. This meant that high ability scores were associated with short call handling times as expected. Average Quality correlated moderately with both abilities.

It is evident that personality and ability work together and correlate with job performance as suggested in the literature review. Multiple correlations reflecting strong effect sizes were obtained for two of the Extreme Importance and High Importance competencies that were indicated by the job analysis, namely, for Quality Orientation and Fact Finding, when hypothesised combinations of personality scales and ability tests were used as the independent variables. For the additional criterion data, multiple correlations representing strong effects were also reported for Average Call Handling Time and Average Quality. For Average Quality the multiple correlation was equal to 0.74. Once again a combination of personality scales from the CCSQ7.2 and the ability tests (CP7.1 and CP8.1) were utilised in obtaining these substantial multiple correlation coefficients.

The results reflect that several personality and ability variables yielded small to medium correlations with performance. Even though a relatively small sample was utilised ($N = 140$), statistically significant results were reported. The findings support the objective of the study and suggest that the Customer Contact Styles Questionnaire (CCSQ7.2), Basic Checking (CP7.1) test and Audio Checking (CP8.1) test add value in the prediction of operator job performance. One should take cognisance of the fact that there were several personality variables that did not contribute to the prediction of job performance.

The study was not without its limitations. Due to time constraints and practical considerations a concurrent validity study was conducted as opposed to a predictive validity study. An attempt was made to maximise the variability of the performance criteria by including only the highest and lowest performers in the sample, but restriction of range most probably occurred in the predictors because the sample consisted of only employees who had survived the initial selection process. Correlation results therefore need to be interpreted with caution. The correlation of Results Oriented and Structured with almost all of the CCCI competencies indicated the possible occurrence of halo effect when ratings were completed and is noted as a potential limitation. The reliability and validity of the additional criterion data measures (i.e. the measurement of call handling time and quality) had not been confirmed.

It is suggested that follow up research in a predictive validity study with a larger sample be conducted. The inclusion of additional objective measures of job performance may shed more light on the relationships between personality variables, ability and job performance within the call centre context.

Finally, readers are cautioned that the meaning of a combination of normative and partially ipsative scores ("nipsative" scores,) is not clear. The nipsative scores appeared to yield satisfactory results in the current application of a validity study and also in studies mentioned earlier (Bank, 2002; Cartwright & Tidswell, 2001).

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We, the authors, state that we have no vested interests with the publishers.

REFERENCES

- Ackerman, P.L. & Heggestad, D. (1997). Intelligence, personality, and interests: Evidence for overlapping traits. *Psychological Bulletin*, 121, 219-245.
- Anastasi, A. & Urbina, S. (1997). *Psychological testing*. (7th edn). Upper Saddle River, NJ: Prentice Hall.
- Anton, J. (2000). The past, present and future of customer access centers. *Customer contact world sourcebook and show guide: The customer interaction handbook, Africa*, 42-47.
- Bank, J. (2002). *Comparison of ipsative and normative selection data and their relevance to performance prediction*. Paper presented at the 17th Annual Meeting of the Society for Industrial and Organizational Psychology, Toronto.
- Baron, H., Hill, S., Janman, K. & Schmidt, S. (1997). *Customer contact manual and user's guide*. Surrey: SHL.
- Barrick, M.R. & Mount, M.K. (1991). The big five personality dimensions and job performance: A meta analysis. *Personnel Psychology*, 35, 281-322.
- Bryman, A. (1995). *Research methods and organization studies*. London: Routledge.
- Cartwright, S. & Tidswell, K. (2001). Customer Contact Styles Questionnaire (CCSQ). In P.A. Lindley (Ed.). *Review of personality assessment instruments (Level B) for use in occupational settings* (2nd edn). London: BPS Books.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. (2nd edn). New Jersey: Lawrence Erlbaum.
- Els, L. & De Villiers, P. (2000). *Call centre effectiveness*. La Montagne: Amabhuku.
- Hurtz, G.M. & Donovan, J.J. (2000). Personality and job performance: The big five revisited. *Journal of Applied Psychology*, 85, 869-879.
- Kaplan, R.M. & Saccuzzo, D.P. (2001). *Psychological testing: Principles, applications and issues*. (5th edn). Belmont: Wadsworth.
- La Grange, L. & Roodt, G. (2001). Personality and cognitive ability as predictors of the job performance of insurance sales people. *Journal of Industrial Psychology*, 27, 35-43.
- Levin, G. (2001). Recruiting strategies for multimedia call centers. In *Call center recruiting and new hire*

- training: The best of call center management review*. Annapolis: Call Center Press.
- Lowery, C.M., Beadles II, N.A. & Krilowicz, T.J. (2004). Using personality and cognitive ability to predict job performance: An empirical study. *International Journal of Management*, 21, 300 306.
- Menday, J. (1996). *Call center management: A practical guide*. Surrey: Callcraft.
- Morgeson, F.P., Campion, M.A., Dipboye, R.L., Hollenbeck, J.R., Murphy, K. & Schmitt. N. (2007a). Reconsidering the use of personality tests in personality contexts. *Personnel Psychology*, 60, 683 729.
- Morgeson, F.P., Campion, M.A., Dipboye, R.L., Hollenbeck, J.R. Murphy, K. & Schmitt. N. (2007b). Are we getting fooled again? Coming to terms with limitations in the use of personality tests for personnel selection? *Personnel Psychology*, 60, 1029 1049.
- Mount, M.K. & Barrick, M.R. (1998). Five reasons why the big five article has been frequently cited. *Personnel Psychology*, 51, 849 857.
- O'Hara, A. (2001). How to develop a retention oriented agent recruiting and selection process. In *Call center recruiting and new hire training: The best of call center management review*. Annapolis: CallCenter Press.
- Ones, D.S., Dilchert, S., Viswesvaren, C. & Judge, T.A. (2007). In support of personality assessment in organizational settings. *Personnel Psychology*, 60, 995 1027.
- Outtz, J.L. (2002). The role of cognitive ability tests in employment selection. *Human Performance*, 15, 161 171.
- Phelps, G. (2002, 18 March). The new world of call center management. *Gallup Management Journal*, 1 3.
- Schultz, D. & Schultz, S.E. (1998). *Psychology @ work today: An introduction to industrial and organizational psychology*. Upper Saddle River, NJ: Prentice Hall.
- SHL. (2000a). The Customer Contact Styles Questionnaire manual and users' guide. Retrieved 11 April 2006 from <http://www.shl.co.za/products>.
- SHL. (2000b). Reliability study. Study number R016. Customer Contact Styles Questionnaire 7.2. Retrieved 18 April 2006 from <http://www.research.shl.co.za>.
- SHL. (2000c). Reliability study. Study number R025. Customer Contact Styles Questionnaire 7.2. Retrieved 18 April 2006 from <http://www.research.shl.co.za>.
- SHL. (2001). Reliability study. Study number R035. Customer Contact Styles Questionnaire 7.2. Retrieved 18 April 2006 from <http://www.research.shl.co.za>.
- SHL. (2003a). Reliability study. Study number R050. Personnel Test Battery. Retrieved 18 April 2006 from <http://www.research.shl.co.za>.
- SHL. (2003b). Reliability study. Study number R047. Personnel Test Battery. Retrieved 18 April 2006 from <http://www.research.shl.co.za>.
- SHL. (2004). Validity study. Study number V032. Personnel Test Battery. Retrieved 18 April 2006 from <http://www.research.shl.co.za>.
- SHL. (2005). *Work profiling and competency design training manual*. Surrey: SHL Group plc.
- SHL. (2006). *CCSQ Psychometric research perspectives*. Pretoria: SHL.
- Tett, R.P. & Christiansen, N.D. (2007). Personality tests at the crossroads: A response to Morgeson, Campion, Dipboye, Hollenbeck, Murphy and Schmitt. (2007). *Personnel Psychology*, 60, 967 993.
- Wright, P.M., Kacmar, K.M., McMahan, G.C. & Deleeuw, K. (1995). P f (M×A): Cognitive ability as a moderator of the relationship between personality and job performance. *Journal of Management*, 21, 1129 1139.
- Zapf, D., Isic, M., Bechtoldt, M. & Blau, P. (2003). What is typical for call centre jobs? Job characteristics and service interactions in different call centres. *European Journal of Work and Organizational Psychology*, 12, 311 340.